

SEP 4 1923

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Vol. XLIX
Number 9

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, AUGUST 30, 1923

Thirty-five cents a copy
Three dollars a year

Capital Theatre -
Detroit, Mich.



LIGHTS fade out. The curtain rises, so silently and smoothly that rarely a thought is ever given to the mechanism which propels that spacious spread of velvet out of sight.

In finer-built enclosed motor cars, the rollers that raise the curtains are, likewise, seldom considered. Shades are drawn with effortless ease; slip up with a touch of the finger. Passengers are not perturbed with irritating rattles or clicks.

Ternstedt Curtain Rollers inconspicuously function with certainty and quiet.

TERNSTEDT MANUFACTURING COMPANY
6307 West Fort St. Detroit, U. S. A.

Division of Fisher Body Corporation

TERNSTEDT

World's Largest Manufacturers of
AUTOMOBILE BODY HARDWARE



FEDERAL

BEARINGS



Reputation and Responsibility

ENGINEERS, Sales Executives, Directing Officers throughout the Automotive Industry accept the "Federal-Detroit" mark on a bearing for what it is—the sure guarantee of highest possible standards in materials and in workmanship.

To maintain that reputation is our responsibility—to ourselves and to our customers.

All Federal Bearings are stamped "Federal-Detroit" on the backs. That mark signifies years of experience in producing the highest quality bearings in the automotive industry. We solicit the opportunity of demonstrating Federal quality and service to you.

FEDERAL BEARING & BUSHING CORPORATION
BABBITT-LINED BRONZE-BACK BEARINGS. BRONZE BUSHINGS. BRONZE CASTINGS
DETROIT — MICHIGAN

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XLIX

NEW YORK—THURSDAY, AUGUST 30, 1923

No. 9

Industry Assured of 2,000,000 Production Each Year

Market is becoming stable. Minimum demands can be determined. Each company can estimate its share of total on basis of past records. Commitments in advance of actual needs make possible saving in manufacturing cost. Closer study of sales is needed.

By James Dalton

MANUFACTURE and sale of motor vehicles has ceased to be a speculation and it is high time the industry recognized this fact.

Markets for motor vehicles have become just as stable as markets for anything else except food, clothing and shelter—the vital necessities. The business fluctuates from year to year just as all business does, but it has become demonstrable that there is a somewhat definite minimum beyond which it will not fall except in a period of deep depression.

When any given industry can be assured of a certain definite market for its products, it is not impossible for the component parts of that industry to work out with a reasonable degree of accuracy the volume of trade they can be assured of getting providing they do not relax their selling efforts. This is a back-log upon which they can base operations without fear of consequences. They may be reasonably certain of sales in excess of this figure, but it will be wise to approach this part of their business with greater caution than that portion about which there can be no doubt.

Unless the country is plunged into a slough of depression as deep as that which engulfed it in 1920, it is exceedingly improbable that the annual sale of motor vehicles ever again will fall below 2,000,000. It is likely to approach that figure even in years when there is a distinct slowing up in general business.

Assuming that the output for 1923 will reach

3,000,000, which seems a conservative estimate, the average production for the past five years will have been 2,300,000. The average for passenger cars will have been 2,032,000 and for trucks 267,000.

The average for the past eight years, with 1923 estimated, has been 2,013,000, with 1,790,000 for passenger cars and 223,000 for trucks.

In one year of this period the country was at war and all its energies were directed to the prosecution of hostilities with many of its automotive plants producing munitions, while in another year it was experiencing the worst depression in its history. The only year since 1915 in which production has dropped below 1,500,000 was 1918 when we were at war. In 1921, the year of greatest depression, output reached 1,661,000.

THE United States has become a nation of motorists. Automobiles long since ceased to be luxuries and became necessities. No one who has once used a car ever will go without one if it can possibly be avoided. New purchases usually are in a higher price class.

By the end of 1923 the registration total will approximate 14,000,000. By the usual method of computation, allowing five persons to a family, there are something like 22,000,000 families in the country, but the actual number probably is nearer 25,000,000, because the average family is not as large as it once

was. This would mean that only about 56 per cent of the families own motor vehicles and it can safely be assumed that every family will buy one as soon as it is financially able.

Population is steadily increasing and the buying power of the country increases rather than diminishes each year. There is no doubt, therefore, that an army of first buyers will come into the market annually, although it is impossible to determine its actual size.

There are no really reliable figures covering annual replacement needs, but the curve will be upwards for several years to come. The best evidence available is that the average life of a car is six and two-thirds years, but assuming that it is eight years, which is an exceedingly liberal estimate, all the vehicles made in 1916 will have to be replaced in 1924, and this would give a replacement market alone of about 1,600,000. This would make it necessary to find only 400,000 first buyers to bring the total up to 2,000,000. On the same basis, replacements in 1925 would approximate about 1,900,000, the production in 1917.

AN estimate of a 2,000,000 minimum demand for all future years is exceedingly conservative. It is more likely to run in excess of that figure.

It is not the purpose of this argument to show that there will be no lack of demand for motor vehicles in the future, however, but rather to demonstrate that the industry has reached a certain degree of stability and that there is a certain definite volume of business of which it can be assured each year.

This minimum of demand has more than an academic interest to every manufacturer in the field. Any firmly established company knows what percentage of the total motor vehicle business it has had for each of the past five years. If it will average this percentage, unless it has steadily declined, it will have rather strong evidence that it can continue to count on that percentage in future unless its product has deteriorated or some other factor has arisen which is likely to influence its sales materially.

This average may have been one-half of 1 per cent of the total. Knowing positively that the minimum demand for motor vehicles in 1924 will be 2,000,000, this company can proceed without hesitation upon a building program of 10,000 cars for next year. There are no signs whatever of serious business depression next year, so that the minimum program will be justified. This schedule undoubtedly will be considerably below the company's output for 1923 and it should be, for it is only an irreducible minimum.

FOREARMED with this knowledge of its minimum requirements for next year, this company can make commitments for the materials needed for 10,000 cars. It can take advantage of price fluctuations downward, it can order in large quantities instead of small, it can place orders well in advance of actual needs and it will be assured of prompt deliveries. These are important factors in keeping down manufacturing costs and the savings effected may be large enough to justify a price decrease which will increase the demand for its products.

With commitments placed for its minimum requirements, which will reach substantial quantities, it will be relatively easy to increase the size of the orders if demand runs in excess of what is definitely assured. The sources of supply will already be in production on the materials needed and little difficulty will be experienced in getting the larger quantities needed.

Such a procedure would have a wonderfully stabiliz-

ing effect upon the entire industry. It would work back all along the line through the parts and accessory to the raw materials field. It would lower production costs, it would lessen employment problems and it would tend to make monthly profits more uniform.

THIS is not a purely theoretical formula, but it can be proved by actual experience. Going through the list of passenger car manufacturers and selecting at random five companies in entirely different production classes which have operated on a fairly stable basis for the five years preceding 1923, we get the following results:

PERCENTAGE OF TOTAL PRODUCTION

Company	1918	1919	1920	1921	1922	Average
A .....	.0804	.0696	.0580	.0535	.0595	.0642
B .....	.0094	.0111	.0125	.0034	.0042	.0081
C .....	.0015	.0023	.0024	.0013	.0023	.0020
D .....	.0014	.0017	.0019	.0024	.0033	.0021
E .....	.0029	.0021	.0033	.0051	.0065	.0040

If the name of Company B were disclosed it would be seen that the procedure would have been entirely justified even in its case.

Materials buying for the past two years has been on a hand-to-mouth basis. Practically all companies in the field were caught with huge inventories when the crash came in 1920 and they suffered heavy losses in consequence. They did not propose to be caught napping again and they acted wisely. It was this very caution which enabled the automotive industry to recover so rapidly.

BUT the conditions in respect to inventories at the beginning of 1920 cannot be compared in any sense with those which would have existed had all companies been buying materials and supplies for well-authenticated minimum needs. Vehicle makers had enjoyed a period of unprecedented prosperity and they apparently had not the slightest idea that a collapse was lurking in the shadows.

They had not been making commitments to meet minimum requirements but rather to meet the utmost capacity of their plants. They had been bidding against each other for supplies and often placed orders in duplicate or triplicate with different vendors on the theory that at least one or two of them would be unable to make shipments.

If inventories and commitments had been based early in 1920 on a definite minimum which could have been counted upon safely, obtained by taking an average for the preceding five years, they would have called for materials adequate to build 1,494,000 cars and trucks. It so happened that the production that year aggregated 2,205,000, but after the output was in the hands of dealers there was enough left, bought at peak prices, to build a good share of the 1,661,000 turned out in 1921. Had buying been based on the minimum theory and added orders been placed only as they were needed, the industry would have been saved an enormous sum.

Incidentally, the indicated minimum production for 1921, based on an average of the preceding five years would have been only 1,756,000 or 95,000 more than were actually produced.

REASONABLE conservatism in business is vastly more profitable in the long run than taking chances and winning once in a while. If the automotive industry had been more conservative in the winter of 1919 and the spring of 1920, it would have saved many millions of dollars. Always to proceed on the theory that business is going to be better next year than it has been

this year is foolish, but there is nothing foolish in making plans for the most economical handling of the volume of business you know you're going to get.

If a company did \$20,000,000 worth of business last year and \$40,000,000 worth this year there might be some justification for expecting a volume of \$60,000,000 next year, but it would be foolhardy to make commitments on that basis. On the other hand, unless there were some special conditions which indicated a tremendous falling off in sales, it might be equally foolhardy not to take advantage of the most advantageous opportunities for making commitments to cover a volume of \$30,000,000.

One trouble with the automotive industry has been that it has not studied itself and its market carefully enough. It still is being guided to a considerable extent by outworn tradition and conclusions drawn from erroneous premises. One of these fallacies is that the annual sales volume is no nearer stabilization now than it was eight or ten years ago. There undoubtedly has been an amazing demand for motor vehicles, but the rate of growth is slowing up.

OUTPUT in 1916, for example, showed an increase of 77 per cent over 1915 and no abnormal factors were involved, while the record breaking production of 1922 showed a gain of only 62 per cent over the previous year when the country was just beginning to recover from an unexampled business depression. If production this year is 3,000,000 it will mean an increase of only 12 per cent over last year, and if it goes to 3,500,000 it will be a gain of only 31 per cent.

It is evident, therefore, that the rate of gain will not be as large as it has been in the past, but it is equally certain that the volume of demand will be much more stable. This stability has increased year by year as the country has absorbed more motor vehicles and it will continue to increase as the absorption process continues.

The time has come when the industry should take full advantage of this measurable degree of stability. A good deal of the guesswork which has governed its activities in the past, more or less by virtue of necessity, can be abandoned.

NO one can foretell with entire accuracy what general business conditions will be next year, but they can't possibly be as bad as they were after the deflation of 1920 was well under way unless the country becomes involved in a war or something quite as unlikely transpires. There may be strong reason to believe that the automotive business will not be as good as it has been this year, but unless there is some totally unexpected catastrophe sales won't fall below 2,000,000.

There is no reason, therefore, why the industry shouldn't prepare now for a minimum production of 2,000,000 motor vehicles in 1924. Obviously, each company must do its own planning, but each has on hand, or should have, enough accurate data to permit it to proceed confidently.

The degree of stabilization which has been reached in the manufacturing end applies with equal force to the distributive organization. It should not be difficult for a dealer in any town or city to find what retail sales have averaged in that territory for a period of years and the percentage of the total business he has been able to obtain. If the quality of the product he handles has not deteriorated and he expends the same amount of merchandising energy, he can be assured of a certain minimum of business and he can make his plans on that basis. The sum total of these minimums for its dealer organization should equal the minimum which the factory has set for itself.

Dealers and manufacturers then will know that if they work as efficiently as they have in the past there is a certain amount of business upon which they can count definitely and they can make plans accordingly.

New Locking Accelerator Pedal

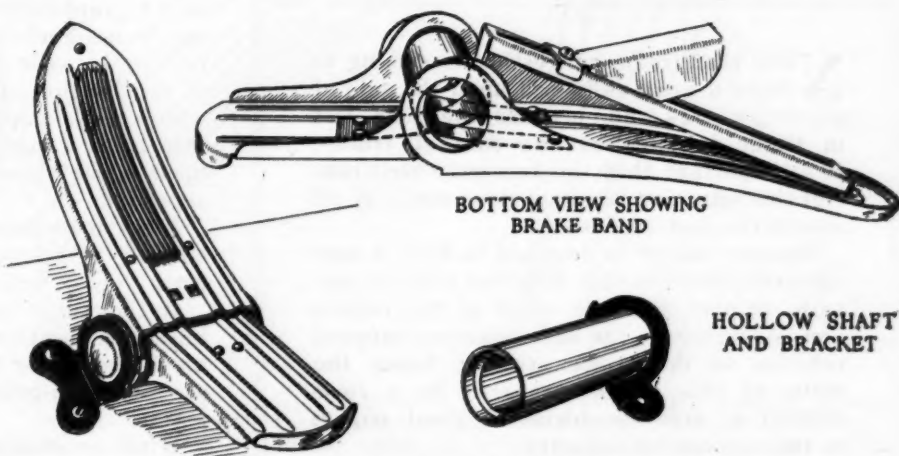
THE accelerator pedal illustrated herewith was designed to overcome the unpleasant speed bursts of the engine often experienced when a car is being driven over rough roads because of the lack of a firm support for the operator's foot on the accelerator pedal. In addition it gives a firm support for the operator's foot and therefore is far less tiring on long trips than the ordinary pedal or accelerator button sometimes used.

The pedal consists of two main parts, a toe-piece and a heel-piece, both of which are pivotally supported on a hollow shaft of considerable diameter which is carried in brackets adapted to be fastened to the foot-board by means of wood screws. The hollow shaft is surrounded by a sheet steel brake band, the ends of which, reduced in width sufficiently so they can pass each other, are riveted to the under sides of the toe and heel pieces respectively.

As long as the operator presses only on one of the parts, both of them are free on the shaft and can be turned at will, but as soon as he rests his foot squarely on both, the brake band is pulled tight on the hollow

shaft and the two parts virtually form a rigid unit with the shaft and its brackets. The accelerator is then locked and is unaffected by road shocks, and the operator has a restful support for his foot. It is also claimed for this pedal that it tends to prevent accidents due to an operator in an emergency pressing the accelerator by mistake instead of the brake pedal.

The pedal is the invention of George H. Townsend.



Townsend locking accelerator pedal

have been given by Heldt.⁴ On the basis of the frontal areas and car weights given by Chase⁵ from Lockwood's data, it is estimated that wind resistance will increase the maximum decelerations given in Fig. 2 by an amount varying from 0.25 to 1.50 ft. per sec. per sec. at 30 m.p.h. to 1.0 to 6.0 ft. per sec. per sec. at 60 m.p.h., depending upon the actual coefficient of wind resistance of the car and its frontal area per unit of total weight. An average value might be taken as about 0.5 ft. per sec. per sec. at 30 m.p.h. and 2.0 ft. per sec. per sec. at 60 m.p.h.

Under the assumptions previously stated the actual number of vehicles passing per hour varies directly with the speed of maximum safe traffic capacity.⁶ It is also true that if either the coefficient of friction or the fraction of the total car weight on the braked wheels while stopping is increased by a given percentage, the maximum deceleration possible will be increased by the same percentage,⁷ and therefore either change will increase the number of vehicles passing per hour. The numerical value of the increase in the number of vehicles would, however, not be indicated by the ratio of the decelerations but by the square root of this ratio.⁸

It will be evident from the foregoing that road surfaces with low coefficients of friction when either wet or dry will reduce the safe maximum capacities of highways. In like manner the more general use of cars carrying a large fraction of their total weight on the braked wheels while stopping will result in an increase in highway capacity independent of the nature of the road surface. Both these facts are worthy of consideration in connection with the increasing congestion of streets and highways.

⁴Distances Required for Stopping, P. M. Heldt, Automotive Industries, Feb. 8, 1923, page 280.

⁵Rear Wheel Dynamometer Tests and Their Significance to the Engineer, Herbert Chase, Automotive Industries, April 20, 1922, page 662.

⁶See Appendix, Equation (4).

⁷See Appendix, Equation (5).

⁸See Appendix, Equation (3).

⁹(Editor's Note—It is clear that cars which are assured to have the same braking ability and to be traveling at the same speed can theoretically run end to end, that is with no space between, since all can stop in the same distance. Practically, of course, some space must be left between, but, still assuming equal speed and equal braking ability, there would seem to be no need, at least in the average case, to allow a space between cars as great as that within which they can stop.)

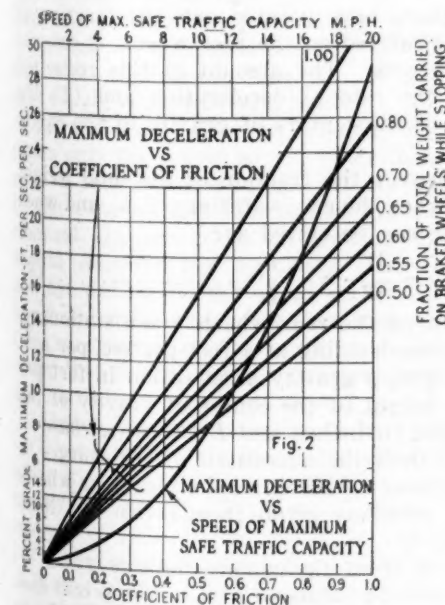


Fig. 2—Relation between maximum deceleration, coefficient of friction, fraction of total weight carried on braked wheels and speed of maximum safe traffic capacity

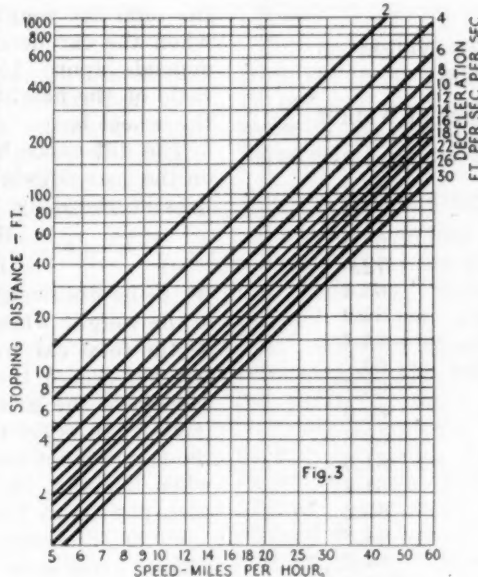


Fig. 3—Curves showing relation between stopping distance, deceleration rate and speed at which vehicle is traveling

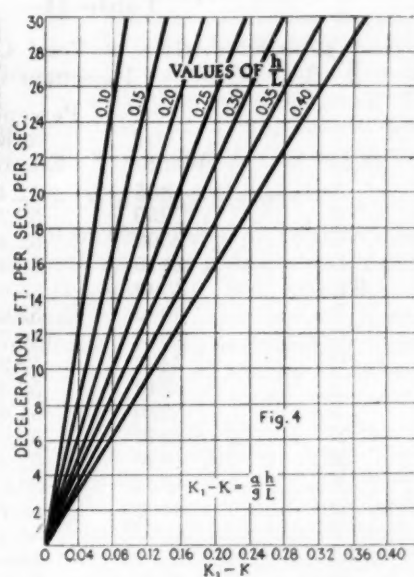


Fig. 4—Relation between braking deceleration and change in fraction of total weight carried on rear wheels for several values of the ratio of height of center of gravity to length of wheelbase

Table I

VALUES for the Coefficient of Friction Between Rubber Tires and Various Road Surfaces:

Road Surface	Coefficient of Friction (a)
Dry Asphalt or Concrete.....	0.64 (b)
Dry Macadam .....	.67 (c)
Dry Macadam .....	.67 (d)
Dry Asphalt .....	.72 (d)
Dry Concrete .....	.63 (e)
Sand or Mud.....	.45 (c)
Wet Pavement .....	.38 (b)
Soft, Slippery, Loose Pavement.	.17—.06 (d)
Greasy Pavement .....	.06 (b)

a—The term "friction" is used in place of a better term. The value probably changes considerably when slip occurs between the tire and the road.

b—H. S. Swan. Eng. News-Record, Feb. 22, 1923.

c—L. P. Kalb, Trans. S. A. E., 1919, Part II, page 72.

d—L. Perisse, Automobiles a Petrol, page 10.

e—Towing test by M. T. D., Camp Holabird, pneumatic tires on 1½-ton truck.

It is evident that the numerical values for the speeds of maximum safe traffic capacity cannot be accepted as correct for all conditions of traffic. The actual spacing of cars in the case of city traffic is affected by such factors as the drivers' reaction time, the use of automatic stop warning signals, and prevalence of "jay-walkers" or thrifty drivers who pass the car ahead to make sure that every empty car length is filled. In spite of these and other conflicting factors, it is believed that the assumptions proposed by Swan as to car spacing⁹ represent safe driving and cer-

tainly serve as a simple basis for estimating the safe capacity of highways in comparison with what might be termed their over-load capacity which, if long sustained, soon must result in an increased number of accidents.

The use of decelerations greater than 8 or 10 ft. per sec. per sec. can be made very uncomfortable, but it is believed that higher decelerations can be attained in a manner neither dangerous nor unduly objectionable to passengers. The advantage of their availability in time of need, regardless of passenger comfort, is obvious.

Although the assumptions upon which the data in Fig. 2 are based are perhaps ideal, they appear to be fundamentally correct and make evident the importance in effectively and safely handling large volumes of traffic, of (1) proper brake adjustment and condition, (2) road surfaces with high coefficients of friction when either wet or dry, and (3) high fractions of the total car weight on braked wheels while stopping.

A careful study of the curves given in Fig. 2 will bring out the importance of obtaining the greatest practical deceleration and indicates that the use of a direct reading and recording decelerometer for the study, testing or inspection of braking systems should yield valuable results.

APPENDIX

The relations between the number of vehicles passing per hour and their speed may be expressed as:

$$N = \frac{5280}{S} V \quad (1)$$

where N is the number of vehicles per hour, V their speed in miles per hour, and S the distance in feet from the front of one car to the front of the car either ahead or behind it. S is assumed to be equal to the length of the car itself plus the distance in which it can be stopped when moving at a speed V . Therefore, by making l the length of the car (assumed to be 15 ft.) and s the distance in feet in which it can be stopped and expressing s in terms of the car speed V and the deceleration a , equation (1) becomes:

$$N = \frac{5280}{l+s} V = \frac{5280}{l + \frac{(1.47)^2 V^2}{2a}} V = \frac{4890}{13.9 + \frac{V^2}{a}} V \quad (2)$$

As a matter of interest the relation between V and s , $S = 1.08 \frac{V^2}{a}$ is plotted in Fig. 3 for several values of the deceleration a .

In order to determine the effect of changes in the deceleration, a , on the speed of maximum safe traffic capacity V_1 , equation (2) may be differentiated with respect to V and equated to zero, giving:

$$\text{when } \frac{dN}{dV} = 0$$

$$V_1 = 3.72 \sqrt{a} \quad (3)$$

where V_1 is the speed of maximum safe highway capacity.

By substituting the value of a from equation (3) in equation (2) and solving for N in terms of V_1 , we obtain:

$$N = 176 V_1 \quad (4)$$

indicating that the number of vehicles passing per hour varies directly as the speed of maximum safe traffic capacity.

The factors limiting the braking deceleration, a , are (1) the coefficient of friction between the tire and the road, f , and (2) the ratio of the total car weight carried on the braked wheels while stopping, k . The relations between these factors may be expressed as follows:

$$\begin{aligned} a &= \frac{F}{W} \\ &= \frac{g}{f} \\ F &= kWf \\ a &= kfg \quad (5) \end{aligned}$$

where a is the braking deceleration in feet per sec. per sec., F the total decelerating force in pounds, W the total car weight, f the coefficient of friction between the tires and the road and g gravity acceleration in feet per sec. per sec. In Fig. 2 values of a are plotted against values of f for seven typical values of k .

Weight on Rear Wheels

As Heldt⁴ and others have pointed out, the fraction of the total car weight carried on the rear wheels is reduced when the car decelerates. The amount of this reduction depends upon (1) the rate of deceleration and (2) the ratio of the height of the centers of gravity of the car to the wheel base.

The difference between the fraction of the total weight on the rear wheels when the car is stationary, k_1 , and when it is decelerating, k , can be stated as:

$$k_1 - k = \frac{W_1}{W} - \frac{W}{W} = \frac{a h}{g L} \quad (6)$$

W_1 being the weight on the rear wheels when stationary, W the weight when decelerating at a feet per sec. per sec., W the total car weight, g gravity acceleration in feet per sec. per sec., h the height of the center of gravity of the car above the ground in inches and L the wheel base in inches. In order to show the magnitude of the changes in the fractions of the total weight carried on the rear wheels when braking, the relations given in equation (6) have been plotted in Fig. 4.

Table II, computed from Lockwood's data as given by Chase,⁵ gives some data on values of k (i.e., the weight distribution when the car is stationary). Few data have been published on the heights of the center of gravity of cars, but it is believed that practically all passenger cars will fall within the range of values given for $\frac{h}{L}$ (i.e., 0.1 to 0.4).

Table II

PERCENTAGES of Total Car Weight on Rear Wheels of Passenger Cars:

Car	Total Weight	Percentage of Weight on Rear Wheels	
		Empty	Loaded (a)
A.....	1805	52.4	74.6
B.....	2250	53.3	71.1
C.....	2500	52.4	68.4
D.....	2110	53.1	72.0
EE.....	3390	33.6	65.4
F.....	3000	53.6	66.9
G.....	2915	50.7	64.4
H.....	3400	52.9	64.7
I.....	3240	53.4	65.7
J.....	3220	51.6	64.0
K.....	3040	54.6	67.8
M.....	4390	52.4	61.6
N.....	4835	53.5	61.8
O.....	3800	52.7	63.2
P.....	4060	54.9	64.8
Q.....	5500	56.6	64.2
R.....	5180	50.3	65.9

Averages. 52.0 65.9

a—Assuming 400 lb. rear-axle load.

Dilution of Crankcase Oil Is Serious Factor Even in Summer

Average of 10 to 15 per cent of fuel in lubricant in hot weather greatly reduces viscosity. The oxidation which strikes under side of hot piston head encouraged by mixing. Means are needed for keeping oil cool and free from dirt.

By A. Ludlow Clayden

Chief Engineer, Gas Engine Research, Sun Oil Co.

ONLY quite recently has it become generally recognized that, in order to prevent excessive wear, engine oil must be changed frequently. It is doubtful if engineers in general realize to how great an extent the life of their products is affected by the lubricants on which they work, and it certainly is not realized what great opportunities there are for improvements in lubrication. The leading oil refiners realized the seriousness of the dilution problem long before the vehicle manufacturers awoke to the situation. The refiner can do and has done a considerable amount to help the situation by the production of oil which will offset, as much as possible, the effects of dilution. There is, however, a very definite limit to what can be done by the refiners, whereas there is no apparent limit to what might be possible if engine lubricating systems were to be restudied as an entirely new problem.

It is a striking commentary upon the lack of appreciation among engineers of the average condition of crankcase oil that a majority, in writing oil specifications, will still describe a lubricant which, when new and fresh, is the best for the engine to operate upon. Such an oil will remain in its new condition only for a few hours; after that it will have undergone a substantial change. If we are going to adhere to the conventional lubrication system without any mechanical changes, then in writing oil specifications we should consider the condition that the oil is going to average during its period of service in the engine. This is an elaborate way of saying that oil when first put in the crankcase must be excessively "heavy" (viscous) in order that it shall not be excessively "light" after it has the normal degree of dilution.

Dilution is often supposed to be a serious problem only in the winter. This is an entirely erroneous view for, while it is most serious in cold weather, it is quite sufficiently serious at all times of year. The average percentage of dilution in crankcase oils, assuming that oil is changed every 500 miles, is between 5 and 25 per cent. A majority of engines rapidly acquire a certain percentage of dilution characteristic of the engine and dependent upon the normal engine temperature. It is to be observed that the amount of dilution is usually, though not invariably, in proportion to the degree of perfection of workmanship, and that engines which consume very little oil

usually, also, throw down but little fuel into the base.

Taking a broad average of passenger cars in general, crankcase samples taken in the summer time will show average dilutions of between 10 and 15 per cent. That is to say, a sample with less than 10 per cent fuel content is uncommon and one with over 15 per cent about equally unusual.

Now an oil containing 10 per cent of fuel having kerosene characteristics is a very different article from a new oil. The original specifications for the new oil, particularly those for flash, fire and viscosity, are profoundly changed. The change in viscosity, especially, is serious.

From the lubrication viewpoint there are three principal things to consider:

1.—The viscosity of the oil under piston temperatures.

2.—The viscosity of the oil at starting temperatures.

3.—The behavior of the oil when subjected to combustion chamber temperatures.

For instance, oil containing 10 per cent of fuel is comparatively easy to ignite and the products of the combustion will not be the same as the products obtained

from combustion of the new oil. Likewise, a dilution of 10 per cent may not have a very great effect upon the viscosity at piston temperatures, but it will have a profound effect on the viscosity at atmospheric temperatures.

Cracking and Oxidation Serious

Before going into detail on the effects of dilution upon viscosity, there are other quite serious changes which dilution promotes, namely, the cracking and oxidation of the oil on the underside of the the piston heads. The blackening of an engine oil is due to oxidation which is caused by the continual washing of the oil over very hot surfaces. In a crosshead type of engine, where the lubrication systems for the crankcase and cylinders are entirely separate, the crankcase oil oxidizes very slowly indeed, showing hardly any discoloration after many hours of use. Crankcase sediments usually consist principally of road dust, but they are also largely composed of oxidation products. The effect of fuel dilution is to encourage oxidation because the light molecules when splashed against the piston will readily be decomposed and their oxidation will involve that of adjacent molecules of oil. Consequently, diluted oil becomes oxidized more rapidly than uncontaminated oil.

THERE is much food for thought in this article which deals with certain factors which adversely affect lubrication with consequent rapid increase in wear.

Both the engine manufacturer and the oil refiner can improve present conditions by a close study of possible refinements in the lubricating system and the character of the oil furnished.

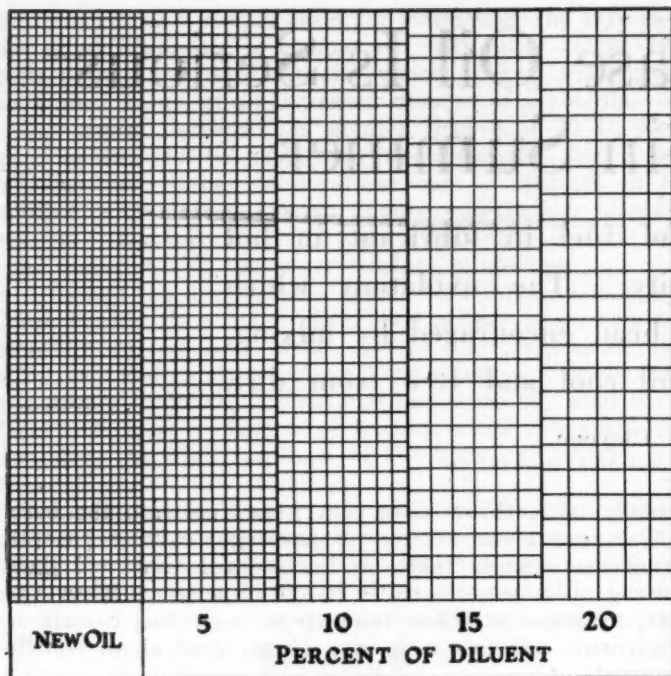


Fig. 1—Graphic representation of effect of fuel dilution on viscosity. Note that its early effects are much more rapid than the later. There is a great change in body with the addition of the first five per cent of diluent.

Almost every engine has its own characteristic in respect to dilution; that is, the oil used will absorb, say, 12 per cent of fuel and then, under the same general conditions of operation, will remain at about that point. This is usually explained by saying that a balance is reached such that the rate at which fuel is coming down is equalled by the rate at which it is being driven out of the oil. The rate at which oil will part with the fuel diluent depends upon the violence with which it is atomized, upon its average temperature, and upon the maximum temperature which it reaches while going through the cycle of operations. A small quantity of oil circulated rapidly will have a better chance of getting rid of diluent than a large quantity moving more slowly.

This, however, does not fully explain the attainment of a balance point because the oil itself is also a factor. If an engine is run under conditions such that there is no dilution, which is quite possible on the dynamometer, it will be found that the lubricant steadily gains in viscosity. This is due partly to evaporation of portions of the oil and partly to oxidation. Oil can be oxidized by long exposure to sunlight or more rapidly by exposure to high temperatures. As a general rule, the heavier an oil is, the more slowly is it oxidized under any given circumstance.

Also, for an oil of any given body the rapidity of oxidation is very considerably affected by differences in temperature over the range obtainable in gasoline engine operation. A crankcase oil that is thoroughly well cooled, kept, for instance, at 100 deg. Fahr., will oxidize noticeably more slowly than if the crankcase tempera-

ture is caused to rise to 130 deg. Fahr. There is also reason to believe that the rate of oxidation is affected by the maximum temperature to which any portion of the oil is heated and this in turn depends upon the piston design and material. For example, under identical conditions of running in the same engine it would be expected that a maximum rate of oxidation would be found, using light steel pistons of the old-fashioned European racing type, and that there would be minimum oxidation with aluminum pistons having thick heads.

Coming back to the effect of all this upon dilution, it follows that by maintaining the oil at a comparatively high temperature in the crankcase, we shall drive off a good proportion of the fuel diluent as it forms. We shall, at the same time, have fairly rapid oxidation of the oil going on and the increase in viscosity due to this latter action will offset to some extent the thinning due to the proportions of the fuel which cannot be vaporized out of the oil at the prevailing temperature. Thus, from the viewpoint of maintaining the viscosity, it would be advisable to keep the crankcase temperature high and to employ an oil which oxidizes rather rapidly.

This, however, is only one side of the picture. First of all, since oils necessarily decrease in viscosity with temperature, we can easily arrive at a condition where we lose in that way as much as we have gained in the other, and perhaps more.

For instance, at 130 deg. Fahr. a given oil with 10 per cent of dilution would have actually a higher viscosity than at 160 deg. Fahr. with but half the amount of dilution.

Bearing Life Affected

Then, again, it is unquestionable that the life of bearing metals is very much affected by their operating temperature; that increasing the temperature very much decreases their ability to resist abrasion. Even with the comparatively sluggish circulation speeds used in automobile engines the oil does exercise a substantial cooling effect upon the crankshaft and connecting rod bearings, so that, from this viewpoint, it is advisable to keep the crankcase oil temperature as low as possible.

Consideration of these last two paragraphs shows one

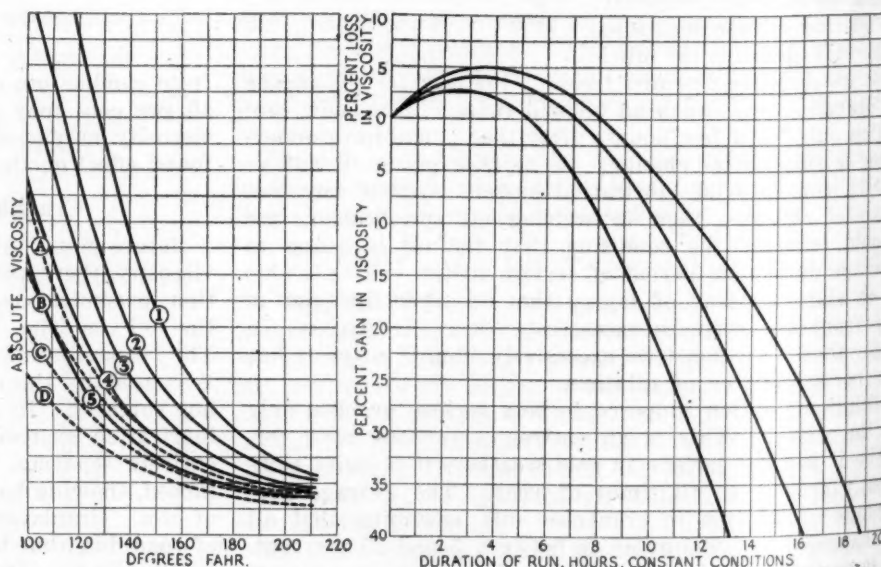


Fig. 2 (at left)—Effect of dilution on absolute viscosity of two oils. 1 is the oil recommended by the refiner, 2, 3, 4 and 5 being the effect of 5, 10, 15 and 20 per cent dilution. A is the oil recommended by the engine maker; B, C and D showing the effect of 5, 10 and 15 per cent dilution. Fig. 4 (at right)—Curves showing gain in viscosity obtained when oils of different composition are run under identical conditions with truly gaseous fuel, that is with no dilution

way by which the proper viscosity of oil for a given engine may be determined. Suppose, for instance, that with normal air temperature of 70 deg. Fahr., normal water temperature and fuel conditions of operations as to speed and load, we know that the crankcase oil temperature will be 130 deg. Fahr. This, of course, is a good deal affected by weather, but not so greatly as might be imagined.

Next, ascertain the percentage of dilution which may be expected under the stated conditions of operation, and let us suppose that the balance occurs at ten per cent. The temperature and normal degree of dilution being known, an oil may be chosen which, with that dilution and at that temperature, will have the viscosity considered proper for the best lubrication of the principal bearings. Such an oil, of course, will, when new, be very much higher in viscosity, and this will cause a slight lowering of the mechanical efficiency of the engine, but the initial dilution is so rapid that the excessively high viscosity will last only a quite short time.

Reducing Rate of Wear

It is the writer's conviction that the rate of wear can be at least halved by comparatively simple mechanical means. Of course, every innovation sounds complicated, and ultimate simplification is rarely realized except from the experience gained in actual production. Consider briefly the things which undoubtedly would be well worth while: first and foremost is an automatic means for keeping the oil free from dirt; that is, dust and metallic particles and the larger oxidation products. This cannot be done by any form of screen with wire mesh, but it can be done with a woven fabric. Very considerable surface is required, and it is hardly conceivable that all the oil could be so screened at each circuit of the system. On the other hand, it seems to be entirely practicable to allow the oil from the pressure release valve to be forced through woven filtering material or to take a small bleed from the main pressure line so that the whole of the crankcase contents will pass through, say, every hour.

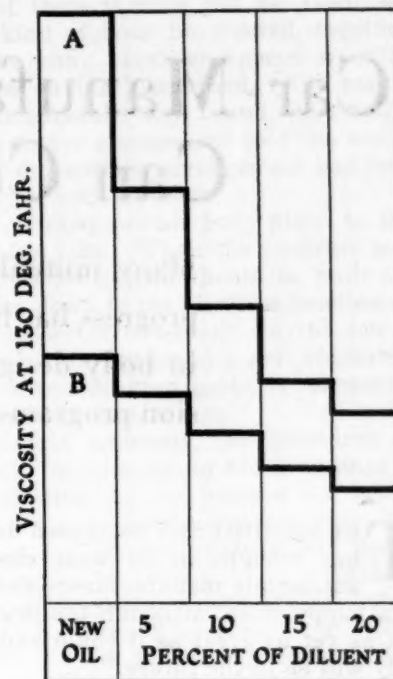
Oil which is free from dirt will give safe lubrication even when very considerably reduced in viscosity, and it would be possible to compensate for dilution to some extent if we could automatically control the temperature of the oil in proportion to its viscosity. A possible method of doing this would be to employ an external radiator. Then, by taking a connection from the pressure line to the top of the radiator and connecting the bottom to the crankcase, additional cooling would be available. To make this roughly proportional to the body of the oil it would probably be necessary to only discover the correct size of bleed orifice to use so that the pressure in the main line being supposed to be constant the proportion which would bleed through the radiator would increase as the viscosity decreased. By combining such a cooling method with adequate screening it is unquestionable that worth while results would be obtained.

Experimental Method

Of course, there still remains the method which has been experimented with considerably, of using an exhaust heated vessel through which the oil is passed slowly and the diluent thereby expelled. Such a device would appear to have very little value unless it were used in conjunction with a really efficient method of screening because, as things are today, by the time oil should be changed on account of dilution it ought also to be changed on account of accumulated dirt.

How so much foreign matter finds its way into an engine is still rather mysterious, but it is obvious that a considerable amount enters through the crankcase breather because on tractor engines, where the air is thoroughly

Fig. 3—Comparison of dilution effects on refiners recommended oil, A, and oil recommended by engine maker, B. The former with 12 per cent, the normal, dilution has same viscosity as the latter undiluted



washed, a good deal of obvious dust deposits is still formed in the crankcase.

Even if the higher refinements are neglected there are still some simple improvements which can be advantageously adopted at practically no cost. Of these, much the most important is a control readily accessible under the hood for opening a crankcase draincock. Such an addition, in quantity production, would probably cost about 20 cents. Adjacent to it there ought also be a stamped plate, instructing that oil be changed regularly on whatever basis of time or distance the manufacturer thinks best.

Finer Mesh Screen

Another simple change which would be of great advantage would be to use a finer mesh screen and to place it on the delivery side of the pump instead of upon the suction side. It is not the oil pump we are trying to protect but the parts to which it supplies oil. Practically any solid at all likely to get into the crankcase will be many times smaller than the oil pump gear spaces. Two advantages are obtained by placing the screen on the delivery side. First, because of the pressure a finer mesh can be used, and, second, because of the perfectly free intake the pump will get into action much more rapidly in cold weather. It is a fact that in many engines today there is practically no circulation for several minutes after the engine is started if the oil is comparatively clean and the weather below freezing. Under these conditions pressure may appear on the gage; in fact, a great deal of pressure; but it does not indicate flow. Where the screen is on the suction side only gravity on a very low head is available for driving oil into the pump. To be convinced, it is necessary only to take the pump assembly of almost any car and try to pour oil through the screen into the pump outdoors on a cold morning.

WRITING in *Allgemeine Automobil Zeitung*, Walter Ostwald combats the view that nickel is the best practical and platinum the ideal material for spark plug terminals. He says that both metals are chemically attacked and in the flames of the combustible mixture become porous and brittle. The leading spark plug manufacturers learned this long ago and are using iron or nickel steel electrodes.

Car Manufacturers and Body Builders Can Cooperate More Closely

Many mutual problems are still to be solved, although much progress has been made in last few years. Rapid advances noted in body design and construction methods. Conservative expansion programs are being followed. Greater use of metal predicted.

TREMENDOUSLY increased demand for closed cars has brought in its wake closer relations between automobile manufacturers and body builders. This is a happy omen, although the degree of cooperation is not as yet as great as it could and should be and probably will be in the future.

Body building has become a great industry in itself. It was impossible to foresee the huge development which would take place in less than half a decade and it is not surprising that the volume of business which appeared almost overnight left manufacturers gasping. New methods, new machinery and new ideas have been evolved with amazing rapidity, but they have not been adequate to meet a pressing situation.

Coordination of all the machinery available is necessary to provide the American people with the closed cars they are demanding so insistently. It is to be doubted, however, if a general plant expansion is justified. Body makers contend, and there probably is justification for their assertion, that there is ample body building capacity in the country today if full advantage is taken of it.

Cautious Expansion

With the automotive industry in its present state of flux, caution is advisable in relation to future production facilities except in a few cases. None of the leading producers, with the possible exception of General Motors, is self-contained in relation to bodies. There are a good many companies which have plants of their own, but with the astounding demand for closed cars it has become necessary to find supplementary sources of supply.

As a consequence the body plants of the country are busier than they ever were before. On the surface there would appear to be ample justification for them to enlarge their capacity and if present conditions continue indefinitely such a course undoubtedly would be wise, but there is no way of knowing what the next two or three years may bring forth.

It is entirely possible that the leading passenger car manufacturers may decide to make all their own bodies and if they were to do so those body specialists who had enlarged their plants would find themselves left high and dry with their resources sunk in an unprofitable investment. Generally speaking, they have adopted a cautious course and they are to be congratulated on their sound business sense. Much greater profit will be found in keeping present factories operating at capacity than in taking chances on a larger business, unless this increased volume is assured for a period of years.

Whether automobile manufacturers will be wise to go into the body building business on a larger scale will

depend upon the position of each individual company. Few concerns are justified at this time in enlarging their chassis-making facilities and until their future in this respect is clearly defined it would seem the part of wisdom to play safe in respect to bodies.

Awaiting Concrete Evidence

The next two or three years should give some definite line on the approximate annual sales of automobiles. Much may be gained and little need be lost by waiting for this concrete evidence. There is substantial reason for believing that the plants now in use are ample in size to meet the needs of the country for a considerable period ahead. Some rearrangement might be useful and convenient, but the manufacturing space is at hand. Several factories could sell many more cars than they can make, but there are numerous others which are not operating at capacity. This applies in the parts as well as the vehicle manufacturing field.

Pending conclusive developments, therefore, the necessary adjustments should be made to take full advantage of present production facilities all along the line. The very caution which the industry has so wisely displayed for the last two years has had a tendency to slow up output. Automobile manufacturers, with the lesson of 1920 fresh in their minds, have hesitated to make commitments covering long periods, even for what they expect to be minimum requirements.

This has been one of the largest factors in producing an apparent shortage of closed bodies. Orders which should have been placed in March or April if body builders were to strike their best production gait by August have been held up until June. As a result car makers have been delayed in getting the bodies they need to supply the wants of their dealers. This is one condition which must be remedied before the flow of bodies can be made as steady and as large as desired. It is one field in which there can be a greater degree of cooperation.

Body Building History

Most of the body plants of the country are relatively small. A large number, especially in the custom field, started back in the coach and buggy days when speed was not such an essential as it is today. Their plants have been built around the original structure and are not ideally constructed for quantity production. They have made surprising progress, nevertheless, in increasing their efficiency. Factories which two or three years ago would have considered 20 or 25 bodies a very big day's work are now turning out twice as many day in and day out without letting down on the quality of

their work even as regards minor details.

Such factories need all the assistance they can get in reaching a maximum of efficiency. They cannot afford to spend large sums for tools, patterns and other equipment and for this reason alone some of them have had to refuse substantial orders. The work which they would have had to do called for too radical changes in their equipment. Automobile manufacturers can get the best results from their sources of body supply if they make comparatively few important changes from year to year in design and construction.

Time Element Important

Body builders assert, however, that from the standpoint of output the element of time is most important. The longer they have to prepare for production the better will they be able to meet the needs of their customers.

Considerable complaint also is made by body manufacturers on the subject of price. They assert some of the car makers who ask for bids on comparatively small quantities seem to think they should get as good a price as those who are all ready to order much longer runs. Costs decrease as the volume of output increases in a body plant just as it does in one turning out chassis. The larger the commitment, therefore, the better the price.

The wide differential between the prices of open and closed jobs was excused for a long time on the ground that the makers of closed bodies were exacting the difference. This was true, up to a certain point, because of the difference in volume, but when a serious effort was made to increase the sale of closed cars by bringing down the price to the purchaser, it was found possible to get much better prices on bodies because of the longer runs.

Body makers now insist that their patrons are not willing to make as large a sacrifice of profits as they should on their chassis but want to take too great a proportion out of the bodies. They feel there is a good many companies in the field, especially outside the large production group, which could shave a substantial sum off their selling price without being quite so exacting in their body requirements and still make a substantial profit even if the reduction did not materially increase their sales. This is a reflex of the old assertion of the parts makers that they are not permitted to earn as large a proportionate profit as the vehicle manufacturers.

Help in Design Offered

Another claim of the body makers is that they could effect substantial economies for their customers without the sacrifice of quality if they were given a somewhat free hand in construction and design. There are two schools in the passenger car field. One works out its body ideas to the last detail and insists upon having them followed. The other tells the body builder what it wants in a general way and lets him do the designing. If the design is satisfactory it is accepted and he does the work.

One body manufacturer in New England had two customers for whom he builds sedans. Their commitments

were identical. One of them turning out an assembled product, outlined the kind of body he wanted, together with the quality. The body plant engineers went to work and put the plan on the blackboard. The manufacturer looked them over carefully and found them satisfactory except for one minor change and told the sedan builder to proceed. He did and the arrangement has been eminently satisfactory to both of them.

The other customer worked out his body plans to the last detail and called for bids. When the contract was awarded he insisted that the bodies should be built according to specifications down to the smallest fraction of an inch. He had an inspector constantly on the job to see that it was done. This automobile manufacturer, who makes his own motors and other parts, is constantly complaining about his body costs.

Taking these complaints seriously, the president of the body company built for him, along his own lines, a body virtually identical with the one ordered but which

could be put together \$50 cheaper without any sacrifice of quality, by making slight modifications. This would have meant a saving of \$75,000 on the one job for the automobile man, but he didn't accept the suggestions. This is only an isolated incident, but it may point a lesson.

Body makers always have complained that not enough attention is paid to body considerations when chassis are designed. There is considerable argument about how much basis there is for the complaint. It depends on which side of the fence you see it from, but it undoubtedly is true that there

is a closer relationship between body and chassis than there once was. More attention is being given the undeniably intimate connection between radiator and body design, for example. Sills are being made a little wider and wheel housings are not brought in quite so close. Such things have an important bearing on service and owner satisfaction.

More Body Engineers Needed

Another contention, not in any sense new but still insistent, is that there are not enough body engineers in the industry. The men who make this part of the car admit unreservedly that a mighty good job has been done in the development of chassis which will give splendid service at a moderate cost, but they assert that engineers capable of developing the chassis for which America has become famous have a big enough job on their hands without trying to specialize also on bodies. It is felt they should leave design in this field to other engineers who have devoted their lives to it.

Few of the disputed points have arisen recently. Most of them, in fact, date back almost as far as the motor car. This is what makes it the more gratifying that some of the differences are being ironed out and that there is a greater degree of cooperation than there ever was before.

This development is not surprising, however, for bodies have become more important than they ever were. This is due, primarily, to the fact that the most serious mechanical defects have been eliminated from motor

BODY builders and automobile manufacturers are getting together more closely than ever before. Many of the problems involved in coordinating body and chassis construction are nearing solution. Car builders might profitably utilize the knowledge of body engineers more fully and might take several other steps which would increase efficiency, but distinct progress is being recorded all along the line.

This article sums up the present situation and indicates what developments, commercial and technical, are likely to take place in the future in the relations of body builders and car manufacturers.

cars and, secondly, to the enormously increased call for closed models. There is greater opportunity for individuality in a coupe or sedan than in a phaeton. The present day motorist takes the excellence of the chassis for granted but satisfies his individual taste by shopping for the body he likes. It is conceded that a line of bodies may make or break an automobile company.

So far as the design of bodies is concerned, that branch of the industry expects nothing radical in the near future. It is admitted almost universally that the trend is steadily toward the use of metal, even for the frames. Some companies still classed as custom builders assert that the time is not far distant when closed bodies will be made entirely of steel. Others, which are using aluminum panels, hold that metal never can be as satisfactory as properly built hardwood frames. All of them

are intensely interested in the use of metal and that is one of the developments they are watching most closely.

The semi-production makers profess not to be especially concerned by the bugaboo of body squeaks and rattles. They insist that they can be eliminated if the frames are properly built. It is only "when the frame is hung on the panels," as they express it, that these troubles become serious. They also aver that bodies are blamed for many squeaks which really develop in the chassis and are transmitted to the bodies.

Taken as a whole the body outlook is not as gloomy as it has been painted. The entire industry is giving it careful study and substantial forward progress is being made. With a little more opportunity for adjustments to meet unexpected conditions, the public will be able to get the kind of car it wants when it wants it.

New Ford Model Has Higher Radiator and Hood

Four-door sedan supersedes two-door type. Body lines improved in various details. Cowl ventilator is added to the coupe.

THE new Ford model has made its appearance. The distinguishing feature of the new line is the higher radiator and hood, together with an apron that extends from the lower part of the radiator shell, covering the front cross frame member completely. The starting crank extends through a hole in this apron.

The two-door sedan, which has been part of the line for a long time, has been discontinued and the front door model, which has been in limited production for some time, takes its place.

There are no price changes in any of the models.

The new radiator is $1\frac{1}{2}$ in. higher than the old one and has 10 per cent more radiation surface. The new apron at the bottom is joined to the front fender aprons on each side, thus giving the cooling unit a less detached appearance.

Aside from the front end changes the open models remain as before, but the entire appearance gives the impression of being lower. The coupe body has been redesigned, resulting in a more trim exterior. The seating arrangement is more comfortable and there is a greater luggage carrying capacity. The doors are wider and open forward. They are heavily framed for rigidity and strength. A cowl ventilator and sun visor have been added and divided cushions on the rear seat make it possible to

fill the gasoline tank under the seat without the driver arising. A more sturdy rear fender has also been added.

The interior fittings have been improved, the door windows being equipped with revolving type regulators. Door locks are also provided. The side windows are equipped with lever type regulators and there is a small recessed shelf at the rear of the seat for parcels. The rear window is larger and is oblong in shape. Improvements corresponding to those in the coupe have also been made in the four-door sedan.

The new type radiator is also fitted to the truck chassis, resulting in better cooling in delivery service.

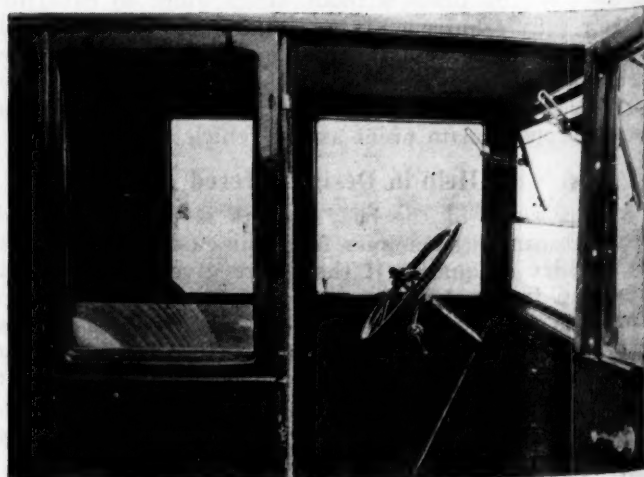
Aside from the changes noted there are no mechanical changes in the car of any kind excepting those minor refinements that are made in the design from time to time throughout the year.

The change over to the new line was made without perceptible interruption to the factory schedule, there being a falling off in the regular production run of about 5000 during the week. This was due entirely to slight delays incidental to the changing of material and will not interfere with the hoped for schedule of 180,000 for the month of August.

All shipments to dealers since early last week have been of the redesigned line.



1—Redesigned radiator is feature of new model.



2—Luggage space has been increased in the coupe

Distributors Should Be Reconciled To Territorial Changes

Reasons for adjustments should be given. Problem of outlining sales areas involves many variables, both in character of the district and ability of dealers. Single yardstick will not apply to entire country. Study of individual cases is needed.

By Norman G. Shidle

DISTRIBUTOR and dealer territories have been subdivided and cut down materially during the last two or three years. Nearly every factory has rearranged its distribution areas in an effort to insure more intensive selling effort in each district. Distributors who once had a whole State as their exclusive stamping ground are now operating within the confines of two or three counties.

As the factories have limited the field of activity of distributors, these in turn have demanded of dealers more business from less territory. Notable exceptions to this trend exist, but the general tendency has been marked.

Naturally, this development hasn't gone ahead without much weeping and wailing and gnashing of teeth, but it has gone on nevertheless. Strangely enough, many of those affected by it have been making more money out of their restricted territories than they ever did out of the larger ones. This experience is far from universal, of course, but the number of sales made in certain areas recently has proved that intensive merchandising methods applied to a small district can often produce as much business as less aggressive work in larger fields.

Methods used in making these territory cuts, however, have not always been such as to better the morale of the distributor and dealer organization. Factories have in some cases displayed a "take-it-or-leave-it" attitude that made an already bitter pill especially unpleasant to take.

IT is a delicate task at best to convince a man that he can get more money out of a territory half as big as he has been used to working. Yet it is well worth whatever sales effort is necessary to make changes with as little friction as possible.

Tact on the part of the factory is specially desirable in those cases where it is not an economic necessity. When the distributors are stronger than the factory, the exercise of tact has much the aspect of making a virtue out of necessity.

All manufacturers will benefit, however, if territorial changes in every line are made with an eye to the welfare of the distributor and the dealer as well as to that of the factory. Even though the latter is already in favor of a certain procedure, it is well to approach distributors with an open mind ready to receive their suggestions and to make changes in the outlined plan.

The factory cannot afford to be too positive concerning redistribution of territory at this time, because most of the proposed plans are largely experimental in nature. A manufacturer makes certain studies which indicate that he should get more business from a certain

area. It seems best to make a change in the territorial lineup. He splits a territory in half. The new alignment may or may not be the last word on the subject. A year or so hence he may find other changes necessary. If he has been too positive about previous moves, later changes will be more difficult to make without generating friction in the distributing organization.

Laying out territories today is a very complex problem. Areas were given originally to certain distributors without any conception of the development that was to occur in motor car sales and use. No one could have foreseen the tremendous growth that was to take place.

AS conditions changed, need for more intensive marketing arose, but the old lines of distribution had hardened. They were no longer plastic. It became necessary to break them down and to rebuild them on a different scale. Efforts have been and are being made to mold these old lines over again, but frequently complete renovation is necessary.

While this change is going on, however, cars must be sold and business must go on "as usual." To stop marketing for a time and build an entirely new distribution structure is impossible. So the old and the new operate side by side.

Millions of cars have been sold with the old territorial layout, which included wide areas. Distributors who oppose smaller districts have this history of achievement to which they can point with pride. They can show there is a very definite limit to which the idea of intensive selling can be carried with profit and that they need plenty of prospects if they are to make their business pay.

Often these arguments are entirely just. Certainly they should be given careful consideration in every case. Where they are finally overruled, definite facts and figures should be available with which to sell the distributor on the change.

HIS work in his new restricted territory will be affected materially by the degree to which he is sold on the new proposition. If the factory has been able to convince him that he can reduce overhead costs and make more money out of cultivating a smaller territory, he probably will start to work with a vim, but if he has the change forced on him, his efforts will be less dynamic. Probably he will spend a good bit of his time looking around for another line of cars to handle.

These points are emphasized because a tendency has arisen in some quarters to seek a general rule, applicable to every part of the country and in every year, by which the number of distributors and dealers needed can be

determined. Some manufacturers, for instance, think they should have one dealer for every 100,000 population and attempt to build their organizations on that basis.

A BRIEF study of the complexity of the problem involved indicates how unfair such a method may be in individual instances. Suppose, for the moment, that all dealers were exactly equal in ability and that all were relatively efficient. Even then some dealers would sell many more cars among their 100,000 population than would others, because the characteristics of the population are quite different in different places. To reduce the matter to an absurdity, it is easy to see that a New York dealer for a \$5,000 car might have a good chance to make a living if his 100,000 included the people who live on Fifth Avenue and Central Park West, while another dealer for the same car would have very hard going if his 100,000 comprised mostly the population of New York's East Side.

Other characteristics besides buying power vary as well. A particular car may be suffering from a bad reputation in a certain section because of poor service given by a previous distributor. The topography and industrial nature of various sections differ materially. A rival car may have concentrated heavy sales artillery in a district for many years and thus put other models at a disadvantage. Any one of a number of factors may operate to make population alone an unsafe guide to the proper number of dealers. The same thing is true of any another single factor, such as income tax returns, bank clearings, etc., that may be used as a standard.

The buying power of a territory is made up of a number of composite factors, the resultant of which may be determined with some degree of accuracy by a study of the sales trend in the area over a long period of years. This resultant will not be the same for territories of equal population. To determine it, even with a fair degree of accuracy, is a task requiring detailed study and constant effort.

BUT even when that has been done the question as to the proper size for a territory has not been answered by a good bit, because all distributors are not equal in ability. And it is very hard to pick out one or two that can properly be used as a standard by which the others might be judged. It isn't practical to take the best distributors in an organization and assume that because they can get a 1000-car business out of a certain territory every other dealer in a similar territory can make a like number of sales. Such men may be used as good examples for the rest, but they cannot be considered as standards. It wouldn't be possible to build up an entire organization of such men, although that is the ideal, of course, toward which every manufacturer is striving.

It is an obvious fact, however, that the ability of dealers does vary considerably. Therefore it follows that a manufacturer may not get the same number of sales in two territories, even though the characteristics of these territories be almost identical as to population, buying power and every other important factor. Having analyzed the territory thoroughly the factory may be able to say pretty well how much business is available, but it is another thing to procure the dealer capable of getting it.

The factory may find it necessary to have two mediocre dealers in one territory to make as many sales as are made by a single dealer in another similar territory. It does not solve the problem to say, "Well, he should get a good dealer in both territories." The facts of the case must be faced.

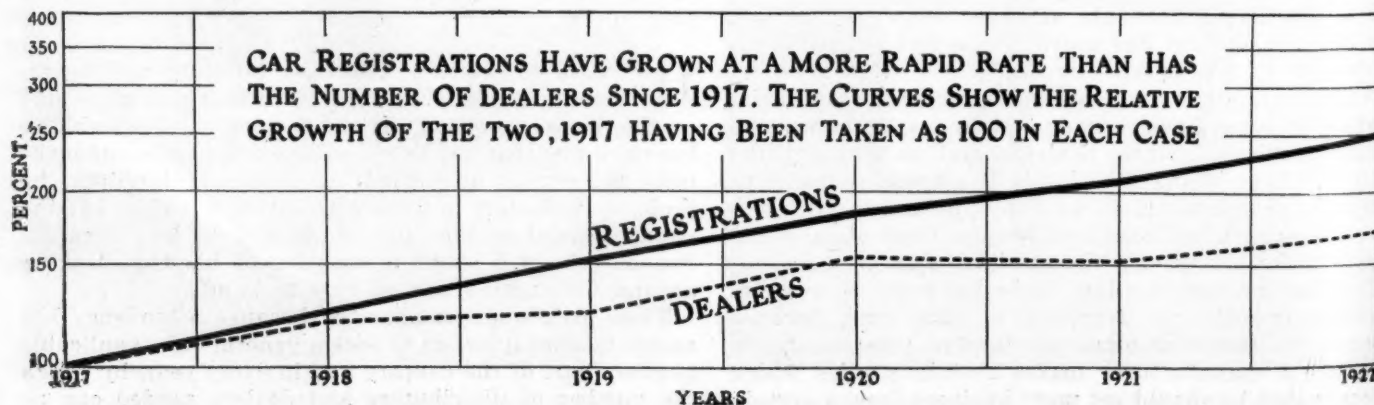
There is a definite limit beyond which it is not profitable to increase the number of dealers in a given area. Each man who handles the line must get a profit from it commensurate with his selling efforts. Too many dealers increase competition to a point where there is nothing in the business for any of them. The dangers involved in the trend are illustrated by the situation of tire retailers. There are so many tire dealers trying to get the same market in some places that none of them can make any money.

THE ability of dealers varies as regards selling, management and finances. A dealer may be a good salesman, but not know how to run his business profitably. He may be able to sell and run his business without having sufficient capital to work his territory properly. All of these things have to be considered when the question of territory size is being discussed.

To add to the complexity of the problem, the ability of any given dealer changes from week to week and from year to year. It may be wise in some cases to give a dealer enough area to take care of his future growth, instead of demanding the utmost sales in the next six or twelve months. A progressive, hard-working, capable dealer may start in business without a great amount of capital. He may have to demonstrate his ability to local bankers before they will finance him sufficiently to enable him properly to cover a fairly large territory. If he shows promise, however, the car manufacturer may do well to gamble on him for a year or two with the prospect of having a sound, enthusiastic and loyal dealer at the end of that time. By doing this he may get more sales from the area over a period of five years than would have been obtained by restricting this particular dealer's territory in the beginning and giving the extra area to someone else less capable.

All this long list of variables in territorial adjustment can be summed up in three major items:

1. Variations in character of territory and population.



2. Variations in sales, management and financial ability of different dealers.
3. Variation in ability of any given dealer from year to year.

The human element, always a factor hard to analyze, plays an important part in each of the latter two considerations. The factory sales manager will be successful in allotting territories nearly in proportion to his understanding of the complex laws which govern human action and the particular characteristics of each of the distributors and dealers with whom he has to deal.

REALIZATION of the numerous variables involved in outlining territories indicates that no hard and fast rule is likely to be developed to solve the problem. Any single yardstick which might be used will work an injustice in many specific instances.

Until merchandising methods have become far more standardized than they are likely to be in the next decade, adjustment of territories will be a question requiring constant study of individual cases and thorough consideration of the material and human elements involved in each particular instance.

Drilling Properties Vary in Brasses and Bronzes

By J. F. Hardecker

IN certain phases of automotive work the choice of a particular brass or bronze as raw material is often dependent upon its drilling qualities. A consideration of various brasses and bronzes in this light leads to some interesting conclusions.

Extruded aluminum bronze is the clearest drilling of all and leaves only a slight, easily removable burr. Its machining qualities may be further aided by the following heat treatment: Heat one hour at 1500 deg. Fahr. and quench immediately in brine. Its constituents become harder and more nearly approach those of cast iron in regard to cutting qualities, which from a non-burring standpoint is one of the best materials.

Red brass is next in order and is the best of the cast materials. It is very free cutting and clears itself of the drill very rapidly. It machines more readily than aluminum bronze, but as it is a cast alloy it is liable to porosity.

Phosphor Bronze Drills Easily

Phosphor bronze drills rather freely, but burrs slightly. Its drilling action is similar to red brass, inasmuch as it clears well of the drill.

Naval brass is not a free-cutting material, but tears and burrs very readily. Cast naval brass drills more like a cold-rolled material of high copper composition.

High copper phosphor bronze burrs very freely, owing to the high per cent of copper and the lack of hardening constituents. The drilling action is nearly the same as with straight copper.

A special phosphor bronze was found too tough to be of good drilling qualities. It did not clear itself well of the drill and burred slightly.

Manganese bronze is not a free-cutting material. In drilling it has a tendency to tear and stick to the cutting edge of the drill, consequently butting when the drill leaves the under side of the drilled piece.

Free-cutting brass is rather soft, offering very little resistance to the drill, a condition that will cause burring as exaggerated in the drilling of lead.

A special naval brass machined similar to manganese bronze, but was possibly a little more free-cutting. The tendency to gum up the cutting edge of the drill was somewhat less.

In automotive construction copper alloys are not used very extensively outside of bearings and radiators, and where used the amount of drilling required is usually not very great, so that the ease of drilling does not figure very heavily in the selection of the material. Nevertheless, it is well to know the machining properties of such alloys, as in some cases an easily drilling material can be used just as well as one that is likely to give trouble.

The chemical compositions are as follows:

	Copper	Tin	Iron	Alum.	Zinc	Lead	Phos.	Manga.
Ext. Alum. Bronze.....	89.94	.11	.38	9.57	.....	.....	.....	.....
Red Brass.....	85	5	.....	.....	5	5	.....	.....
Phosphor Bronze	80 max.	10	10	.....	.....	.....	2.5 max.	.....
Naval Brass..	59	1	.....	.....	39	.....	.....	.....
High Copper Phos. Bronze..	94 min.	3.5 min.	.1 max.	.....	3 max.	2 max.	.05	.....
Special Phos. Bronze.....	88	10	.....	.5	.....	.....	1.5	.....
Manganese Bronze.....	57-60	37-40	1 max.	.....	.5 max.	.2 max.	.....	.3 max.
Free Cutting Brass.....	60-63	.....	.1 max.	.....	remainder	3.	.....	.....
Special Naval Brass.....	59-64	.5-1.5	.1 max.	.....	remainder	.3 max.	.....	.....

New Electric Drill

A NEW 1/4-in. electric drill, designated the U. S. Automatic, has been put on the market by the United States Electrical Tool Co. The handle, which is cast integral with the aluminum body, is on a straight line with the three-jaw screw-back chuck. The locating of the switch lever at the extreme top of the grip is an innovation in drill control, and in addition to being in a very convenient position for the operator's forefinger, it also forms a grip support when in the running position.

The motor operates on both direct and alternating current; it is fitted with ball bearings and hardened chrome



U. S. automatic electric drill

nickel steel gears that run in grease. Eight feet of rubber-covered cable and a one-piece swivel attachment plug are furnished with the drill. A U. S. bench base, arbor and wheel can be used to transform this drill into a grinder, and, in addition, it can be mounted in a U. S. drilling stand or post bracket to form a bench drill or bracket drill, respectively. The weight of the drill is only 5 3/4 lb. complete, while its overall dimensions are 10 by 4 in.

Pressure Is More Evenly Distributed Over Surface of Band Brakes

Part IV

This type has other advantages, but trend has been away from its use in recent years. Tendency to accumulate dust and grit and low heat-dissipating qualities are among unfavorable characteristics. Use of engine for braking has good features.

By P. M. Heldt

IN the earlier American cars band brakes were quite prevalent, but recently there has been a tendency away from them, and European designers have never taken kindly to this type. There are a good many points both for and against the band brake. One good feature is that the lining can extend almost all the way around the drum, hence for a given retardation the unit pressure on the lining can be made smaller, which tends to increase the life of the lining. Another advantage is the ease with which adjustments can be made, as the mechanism is all on the outside. Owing to the flexibility of the band the pressure between lining and drum is likely to be more uniformly distributed over the whole friction surface than in a brake of the block or rigid sector type, though this depends to a large extent on details of design.

Some people attach considerable importance to the fact that with a band brake one gets a "wrapping-on" effect which increases the retardation for a certain brake rod pull. If a rope or band is wrapped around a brake drum, having one of its ends securely anchored to some fixed part and a pull exerted on the other end, then, owing to the friction between band and drum the tension in the rope will be gradually increased or decreased from the end to which the pull is applied to the fixed end, according to whether the pull and the rotation of the drum are in the same direction or opposite. However, owing to the fact that brakes must hold for backward as well as for-

ward motion, had very little holding power for reverse motion. To make them equally effective for both directions of motion, band brakes are now generally anchored at the middle and have equal pulling forces exerted on both ends. The operating mechanism is generally of the type shown in Fig. 1 and it will be seen that since the pull rod is substantially horizontal and tangents to the band circle at the points where the lugs for the mechanism are located, make the same angle with the horizontal, the forces at the ends of the band must be alike. Since the drum rotates left-handedly, the tension in the upper half of the band will increase from the point where the pull is applied to the anchoring point, while the tension in the lower half of the band will decrease. The ratio of the tension at the end to the tension at the anchoring point is a function of the arc covered by the band and of the friction coefficient. Let θ be the arc of circumference covered by that portion of the band between the fixed point and the free end, expressed in radians, and let f be the coefficient of friction between band and drum. Then, if P be the pull at each of the free ends of the band and P_1 the pull on the anchorage by the upper portion of the band, it can be shown that

$$P_1 = P e^{f\theta}$$

where e is the base of the natural system of logarithms (2.71828). The friction between band and drum between these two points is

$$F_1 = P_1 - P = P(e^{f\theta} - 1).$$

For the lower portion of the band we have the reverse condition. Let P_2 be the pull of this portion on the anchorage; then, since the pull on its free end is P , we have

$$P = P_2 e^{f\theta}, \text{ hence } P_2 = \frac{P}{e^{f\theta}}$$

The friction between this portion of the band and the drum therefore is

$$F_2 = P - P_2 = P \left(1 - \frac{1}{e^{f\theta}} \right)$$

With a friction coefficient of 0.3 between band and drum and an arc of contact for the half band equal to 165 deg. (= 2.88 radians) the value of the exponent $f\theta$ becomes 0.865 and the friction between the top half or wrapping half of the band and the drum is

$$P(2.71828^{0.865} - 1) = 1.375P.$$

Similarly, we find the friction between the bottom half or unwrapping half of the band and the drum to be

$$P \left(1 - \frac{1}{2.71828^{0.865}} \right) = 0.578P.$$

This is the final article of a series on brake design by P. M. Heldt. Three other articles have appeared in previous issues as follows:

1. Proper Study of Weight Distribution Essential to Correct Brake Design. August 9
2. Advantages of Transmission Brakes Outweigh Disadvantages. August 16
3. Front-Wheel Brake Design Involves Two Major Problems. August 23

ward motion of the wheels, this principle is seldom utilized in brake construction.

The steam runabouts sold in this country about twenty years ago had band brakes of this type, acting on a drum on the differential, one end of the band being anchored to an arched axle tube and the brake rod connected directly to the other end. These brakes, which were called single

Consequently, the friction of the top half is equal to 1.375 times the pull on the free end and the friction between the bottom half and the drum equal to 0.578 times the pull on the free end of the band. The total friction between band and drum therefore is equal to 1.953 times the pull on either free end. This friction is the same whether the drum is revolving forward or backward, because in either case one half of the band tends to wrap and one half to unwrap.

If the band were anchored at one end and extended over an equal arc of circumference (330 deg.), then the tension of the fixed end would be 5.64 times as great as at the free end, and the frictional force 4.64 times as great as the pull on the free end. On the other hand, for reverse motion the tension at the fixed end would be only 0.177 as great as the tension at the free end and the frictional force would be equal to 0.823, the pull on the free end. Hence such a brake is 5.64 times as strong in checking forward as in checking backward motion.

The figures here given are by way of illustration only, and the results would vary with the friction coefficient and the arc of contact. The values assumed for these two variables, however, correspond to actual practice. Similar calculations to those carried out above can be made for other proportions between the wrapping and unwrapping portions of the band. For instance, with the wrapping portion equal to three-fourths the whole length of the band, it is found that the friction, and hence the braking effect, is increased by 54 per cent for forward motion of the car and decreased about 38 per cent for reverse motion, as compared with a brake having the anchorage at the middle of the band and therefore equal wrapping and unwrapping portions.

The two curves of Fig. 2 show the increase in the forward braking power and the decrease in the reverse braking power resulting from increase in the proportional length of that part of the band which is wrapped by forward motion of the car.

It has been suggested that an effect similar to that of the wrapping on of a single acting band brake could be secured by placing the operating lever at the bottom of the brake. As the brakes take effect the axis tends to stay behind the rest of the car, and with a Hotchkiss drive car there may be an actual rearward displacement of 1 in. This, of course, puts further tension on the brake rods if their forward end is fixed, as by a latch pin in a sector notch, and then applies the brakes more tightly. Unfortunately this is also a one-way principle, for if the brakes are applied while the car is running backward down hill, the rear axle is displaced forward with respect to the chassis by the application of the brakes, and the tension in the brake rod decreases. Even for stopping from forward motion this principle is of little practical importance because usually the forward end of the brake rods is mobile, the driver exerts a given pressure on the brake pedal or lever, and if the brake anchorage yields his foot or hand will follow up this motion. Hence there will be no change in the braking effect.

Two Disadvantages

There are two disadvantages connected with band brakes, particularly those acting on rear wheel drums. The brakes being on the outside of the drums, without any protection and located close to the wheels, dust and grit are sure to enter between the lining and drum and, acting as an abrasive, will hasten the wear of the lining. The other disadvantage is that the band brake covers the drum with a heat insulating layer and that the heat dissipating facilities are therefore very poor. The objection that the band brake is unprotected against road dust, etc., is probably largely offset by the fact that oil or grease from the

axle cannot get onto the outside of the drum nearly as easily as onto the inside. In fact, the chances of the external band brake being rendered ineffective by oil from the axle are practically nil, while in the case of the internal brake this depends upon the effectiveness of the packing in the axle and upon other features.

Radiating Surface

The subject of radiating surface leads to a consideration of the use of brakes in descending mountain roads. One European manufacturer holds that the brakes should have sufficient heat radiating or heat dissipating capacity to take care of all the heat generated while descending a 10 per cent grade of unlimited length at 30 m.p.h. with

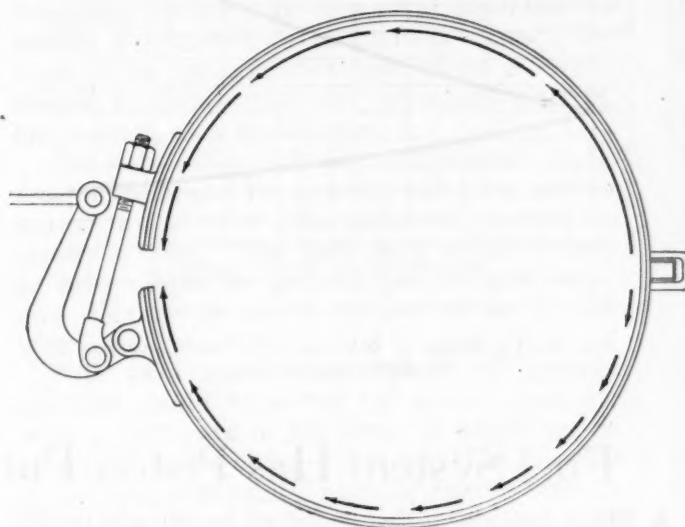


Fig. 1—Variation of tension in brake band

the engine in gear but throttled down. There are certainly very few cars whose brakes would withstand such a test. In the majority the temperature of the brake lining would soon reach the breaking-down point where the binder softens and the friction coefficient of the fabric decreases greatly. On American cars the brake drums are usually secured to the spokes of the rear wheels and cases have been reported where the spokes were charred by the heat transmitted to them by the brake drums.

The average driver when he comes to a down grade of unusual steepness and length puts his engine in low or intermediate gear and throttles it down. Along many of the main touring routes at the beginning of such descents there are warning signs cautioning drivers to throw their engines in low gear and descend that way. In the case of the conventional engine only the friction of the moving parts and a slight consumption of power due to the cooling and leakage of air furnish a retarding force.

When the engine is used as a brake the gas pressure within the cylinders never exceeds the maximum compression pressure and cylinder pressure therefore is not a very big factor in the braking effect. This effect is mainly dependent upon the friction of the moving parts resulting from inertia and centrifugal forces. Both of these forces increase as the square of the speed, and an engine therefore is particularly effective as a brake when running at high speed.

For service in mountainous country the use of the engine as a brake has much to recommend it. Its frictional surfaces are lubricated and their wear is reduced to a minimum. In fact, the friction is caused by one layer of lubricant sliding over another and most of the heat generated is transferred directly to the jacket water. For the greatest braking power the engine must be provided

Why Is a Garage?

WHY is a garage?

This may sound like a foolish question, but it isn't as idiotic as it appears on the surface. Millions of American motorists have found perfectly good housing accommodations for their cars in barns on their farms or in their woodsheds or some other building already standing. More millions have had to provide a special shelter which does little more than keep off rain or snow. Still other millions have no cars because they can't afford to pay garage rent or because shelter would cost more to build than the cars themselves would cost or because easily accessible garages are not available.

The potential market for automobiles, especially in the cities, would be largely increased if some practical solution could be found for the garage problem.

This question may seem as difficult of solution as that of lessening traffic congestion, but it isn't.

When livestock provided the only motive power for vehicles, barns were a necessity, for a horse, or even a mule, left out in the open at all seasons would deteriorate very rapidly. This would have resulted in heavy economic loss, even though there had been no Society for the Prevention of Cruelty to Animals. Consequently housing had to be provided for the livestock.

The same economic principle has been involved up to this time in the housing of motor vehicles, although the element of possible cruelty is lacking. An automobile suffers no physical pain when it gets cold or wet. The owner is a vicarious sufferer in this respect when he gets his inevitable repair bill.

It is conceded that the time is near at hand when a large majority of the passenger cars in use will be of the inclosed type. If the finish is made weatherproof, if the chassis is made rustproof, and if the doors and windows are snugly fitted, is there any logical reason why they can't be left out of doors just as safely when they are not in use as when they are?

There seem to be only two arguments against it. One of them is the use of cars in climates where severe frost is likely to cause damage when the vehicle is exposed to the elements the year round. Air cooling is one remedy which has been successfully applied by some manufacturers. Another would be the use of non-freezing solutions which would withstand even the coldest weather. Such solutions as are

now available leave much to be desired, but there is little reason to doubt that a relatively small sum spent in intensive research for such a product would produce the desired result.

Much the same can be said concerning lubricants, which would have to be selected to withstand extremely low temperatures without freezing. Such oils are now obtainable, but the supply is supposed to be limited. Should the demand be created, however, there is every reason to believe that the petroleum chemist and refiner soon would meet it.

The only other difficulty would seem to be fear of theft, and the average lock on a private garage would offer little resistance to the determined thief. The back yard would be just as safe. With the locking devices now available it is not as easy to steal a car as it once was.

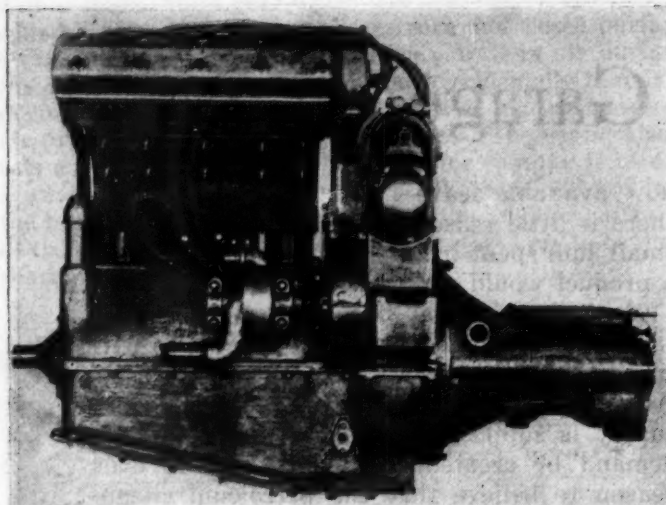
With cars made weatherproof the garage question would be solved for almost everyone with a back yard of his own. It would not be so simple in the cities, but it would be possible to provide community parking spaces even in residential districts where the theft menace could be met by per capita assessments for the payment of watchmen. Such parking spaces need not of necessity be unsightly.

Weatherproofing of closed cars under present-day conditions is not impossible and it need not add greatly to manufacturing costs. The chassis can be rust-proofed, doors and windows can be so made that they will not warp out of shape, and the era of waterproof finish has dawned.

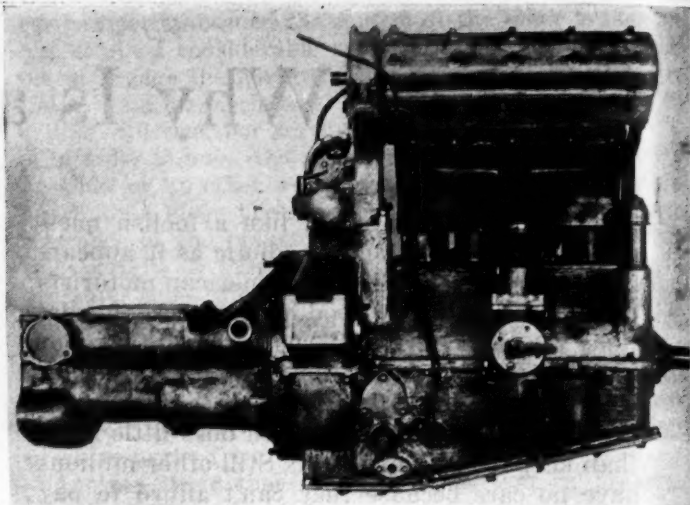
Garages will never entirely disappear, but the idea of making them less and less of a necessity as use of the closed car increases is not as chimerical as it may seem at first glance. The industry soon will be confronted with the necessity of finding new legions of potential purchasers and it then will give more serious consideration to such questions as garage and parking space, traffic congestion, the promotion of safety, highway policy and collateral problems.

Anything will wear out eventually if exposed to the elements constantly, but the motorist who can own a car without having to worry about garage space is not likely to complain bitterly if his car deteriorates a little more rapidly than it would if he stored it in a heated, weatherproof, damp-proof apartment which costs in the aggregate as much as the vehicle in which he rides.

J. D.



Exhaust side of Talbot-Darracq racing engine



Carburetor side of Talbot-Darracq racing engine

New Talbot-Darracqs Generate 70 H.P. at 5000 R.P.M.

Racing cars have piston displacement of 91.5 cu. in. Design is similar to that of Sunbeams which won Grand Prix. Engine has four cylinders and two camshafts. Powerplant measures only 22 in. overall. Roller bearings are used except on piston pins.

By W. F. Bradley

SEVENTY horsepower at 5000 r.p.m. is the output obtained from the new 91.5 cu. in. Talbot-Darracq racing cars which make their first appearance at Boulogne on Aug. 30 and will run in all the long-distance events of the present season. The new cars are built to the same general design as the 122-in. six-cylinder Sunbeams which won the French Grand Prix, Vincent Bertarione being responsible for the details under the direction of Louis Coatalen. The Talbot-Darracqs, built in the French works of the S. T. D. Syndicate, have four 2.63x4.13-in. cylinders. The cylinders are separate steel forgings united by a common sheet steel water jacket and have two valves inclined in the head at 42 deg. Drive for the two camshafts is at the rear by means of a train of spur pinions, with bevel gearing for the cross shaft operating the Scintilla magneto. The water pump is fore and aft, on the exhaust side of the engine. There is a single plug per cylinder mounted vertically in the head. An advance of 80 deg. being necessary for these high speed engines, provision is made for rotating the armature.

Roller bearings are made use of throughout this engine, the only part having

plain bearings being the piston pins. The connecting rods are I-section with split ends, the bearings also being in two parts and having the rollers in direct contact with the shaft. There is a bearing between each pair of adjacent cylinders and one behind the timing gear. Lubrication is of the dry sump type, with a direct delivery of oil through the hollow shaft to the main and connecting rod bearings. Pistons are aluminum, with floating pins.

Engine Size Small

The engine, which measures only 22 in. overall, is a unit with the clutch and four-speed gearbox and is supported at three points on the main frame and the front cross member. Drive is by open propeller shaft, with ball bearing universal joints to a differential-less rear axle, the housing of which is built of two steel forgings with a central aluminum casing.

The main oil tank is mounted amidships, extending the full width of the chassis and having a ribbed base for cooling. The sheet aluminum underpan joins up to the oil tank, thus giving an entirely unbroken



Talbot-Darracq 91.5 cu. in. racing car

undersurface which completely incloses the rear axle. The front axle and the springs are not inclosed, but in order to improve the streamlining of the car the frame members are inswept at the rear to conform to the body outline.

Brakes are fitted on all four wheels, but there is no servo-mechanism, as on the Sunbeams, and the front axle is a single piece I-section forging. Aluminum on T-

section steel frames is used for the two-seater bodies. The seats are staggered to the maximum, and the mechanic has a grip on the right hand frame member, behind the driver's seat. Wheelbase is 86 in., track 43 in., tire size 710 by 90 and the complete weight of the car, with tanks empty, 1433 lb. The car will be driven in the various European events of the season by Guinness, Se-grave and Divo.

Special Device Gives New Cars Severe Test

Eccentric drums, so timed as to put entire car under a hard, racking strain, are chief features of stand used at Packard.

AS a part of the regular production and inspection routine, every completed Packard car is run over a final testing stand just before delivery to the sales department. At this station the entire car as it is to be delivered to the customer is inspected for noise which may arise from any squeaks or rattles and become apparent on the road.

The salient feature of this device lies in the fact that each of the drums is eccentric and timed to throw a severe racking strain upon the entire car. The center of the circumference of all the drums is located $\frac{3}{4}$ in. away from the center of rotation of the axles. The height of the surface of the drums above the floor therefore varies $1\frac{1}{2}$ in. throughout one revolution. As the left rear drum is at its highest point when the right front drum is at the lowest position, the total difference in level is 3 in. The drums are timed so that this difference in level alternates from one side to the other.

Stands at Shipping Room Entrance

Two of these stands are located at the entrance of the shipping room. The first accommodates cars of the shorter wheelbase while the other handles the longer wheelbases. Both sixes and eights are run over these stands. Each unit consists of four drums with which the wheels of the car to be tested make contact. These drums are carried in pairs on two axles and are installed in a pit so that their upper surfaces are slightly above the level of the structural steel approaches. The front and rear axles of the stands are interconnected by a link chain which transmits the motion of the rear end to the front through sprockets. As illustrated by Fig. 1, a lock restrains the front axle of the car. This lock is manually

operated by a lever located alongside the pit as illustrated in Fig. 2.

In operation, the car is driven onto the stand and secured in place as the front axle contacts with the lock. The gears are then engaged and the car is driven at various speeds to approximate road driving. One man is stationed in the driver's seat, another in the pit under the car and the third at the outside of the car on the floor level. Each of these men listens carefully for any undue noise. Because of the inspectors' location every portion of the car receives attention. In case any unusual noise develops, it is immediately traced to its source and returned to final assembly for correction. If nothing develops in the test, the car is run to the shipping room.

Test Conditions Difficult

It is stated that the conditions of this test are much more severe than those encountered on the road, as the entire car is racked 3 in. from side to side twice for the equivalent of about every 8 ft. of wheel travel. This alternation of twisting effort exceeds anything but the most severe and unusual driving conditions. No driver would attempt to put his car over equivalent road at the same speeds that are encountered in this test. In addition to the severe conditions imposed, this test is conducted in comparatively quiet location. The operators are not distracted by external noises and ordinary road circumstances. As this operation is the last step in the production and inspection of the car, the regular chassis and complete car road tests have already occurred before delivery to this station. An extremely severe test is made at this point with no danger to the driver or possibility of damage to the mechanism or finish of the completed car.

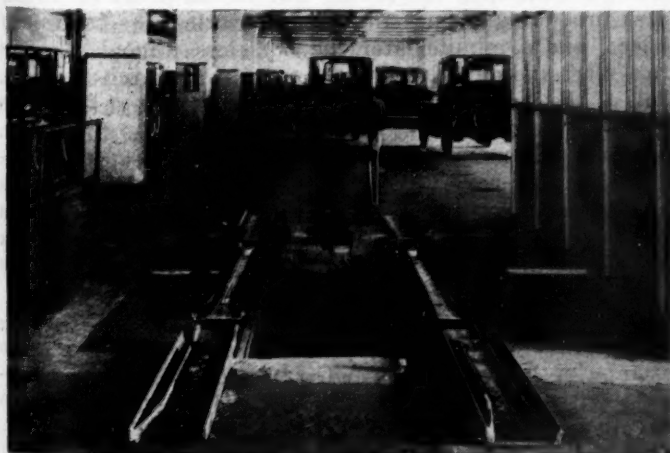


Fig. 1—Final test stand showing front axle lock and drums in pit



Fig. 2—Car locked on stand. Note difference in height of right and left rear drums

Motor Buses Are Changing Social Life in Far East

People are being bound into closer economic units. Roads are developed to carry automobiles. Better transportation makes it easier to keep miners at work. Fear of strange vehicles is quickly overcome. Agriculture has gained material benefits.

SO gradual has been the adoption of automobiles in Japan, Korea, Manchuria and China that the significance of their presence has scarcely been recognized, even by those who have profited; and the numbers are not limited to the operators of motor vehicles, for as the result of automobile transportation thousands of Asiatics have been benefited, materially and socially. Men and women in all the countries bordering on the Pacific have had their sphere of life broadened, for no longer are they restricted to their native villages by the lack of transportation. Now by the payment of a few sen, coppers, or cents, they may travel quickly and with more comfort than they or their ancestors have ever known to neighboring villages and towns, and there learn that a man born elsewhere is not different and may be just as harmless as the men who grew up with them.

It is not the luxurious private car of the wealthy that is giving these benefits, but the humble autobus, the despised jitney, that is changing the habits and thoughts of Asia. These are the pioneers that are opening the isolated territories by serving as the shuttles that are weaving the people into closer economic units.

As in America, the automobile has forced road-building in the Far East. During the past five years more new roads have been built in China than in any previous five decades. And their building has, with few exceptions, followed this formula:

ONE or more capitalists are interested in the possible profits of a motor-bus line. By the payment of certain sums to the provincial authorities, a permit is issued to build a road. In a very short time this road stretches for miles, for construction costs for the dirt roads are low. Over this private highway then run lightweight but strong American motor-buses, capable of carrying from ten to fifteen people. The fare is low, perhaps twenty-five coppers, less than five cents for a five-mile ride. There is great excitement on the inaugural day when the first bus reaches the starting point; the owner has talked much and glowingly of the pleasure of auto riding, of which there have been many rumors; now the day has come when people of their own village are to ride in this wheeled vehicle that goes without power of men's muscles

or the strength given by the shoulders of animals.

THE brave ones who have volunteered for the first journey are surrounded by admiring friends and relatives. The owner indicates the places, according to the importance of the guests. When all are seated the driver is seen to press his foot on a pedal, a steady roar comes from the front of the contrivance, the crowded vehicle trembles, the guests look uneasily at the owner, who has turned in the front seat with a smile of reassurance, and then the wheels begin to move and a few minutes later the vehicle has disappeared over the new road in a cloud of dust. The spectators talk excitedly, but presently compose themselves in groups to await the return of the bus; for has not the owner said that in two hours it would be back after he had given tea to his guests at Chung Ling Show?

An hour passes and from the elders some ominous warnings of the fate of those who forsake the ways of their fathers; anxious relatives begin to separate themselves from the waiting crowd, to go down the road by which their kin have disappeared. It is a time of doubt, and to the minds of many come thoughts of the paper prayers that will have to be burned to scare off the devils that have stricken the town. But in the midst of all the dire predictions comes the sound of cries, the tooting of horns, and a minute later the horseless wagon has come to a stop, and out of it pile the pleased and excited riders, full of the wonders of the journey. Then there are more volunteers; for the first day there is no charge for riding. By nightfall many have learned the joy of quick transportation and have become motor enthusiasts; for such is the power of joy-riding that it can overcome the prejudices of centuries in an hour. Thereafter the bus runs back and forth without fear or prayer, a vital part now in the life of the people of the two villages.

The desire for quick transportation has worked a profound transformation in the ancient city of Canton. Five years ago that city well merited its reputation as the pest-hole of the East; wheeled traffic was impossible owing to its alley-like streets. Today it has many miles of wide surfaced highways, over which operates a motor-bus line that is the boast of the Cantonese when they tell of the progress of their city. And when the Chinese from distant

HERE is a vivid word picture of what the motor bus and the automobile have done to change the social and economic life of the Far East. It tells in a way that cold figures never can do how the people in the cities, on the farms and in the mines are using and benefiting by motor transportation.

The story is reprinted from the June 3 issue Japan Advertiser, an American daily published in Tokyo.

parts learn that the hard surface of the new streets but recently constituted the ancient city wall, he goes away convinced that this capital of the South is a wondrous place, and to his friends at home he repeats with conviction the story of the great benefits which Canton now enjoys.

YOU may still be carried in a sedan chair in Canton, but the people who pass you are for the most part confident that within their lifetime one may go to any part of the city in a motor car, for the group of progressive Chinese who control the destiny of the city are taking practical steps to meet the demand for better transportation. Already the service provided is inadequate to meet the demand. Boarding one of the vehicles at almost any hour of the day recalls the crowding on the Interborough Subway.

Korea's social and economic future is rapidly being changed by the motor car. Before the commencement of the present road-building program of the Government, travel was strictly limited to the area served by the railroad which cuts through the heart of the country from north to south. Today it is possible to travel long distances on both sides of the railway over fair roads in motor-buses. Because of this Koreans are moving into the hinterland to make productive the acres that have lain idle through the centuries.

Dependence upon the jitney to open new territories is not confined to Korea. You may find them in the far interior of the Federated Malay States, a region which, besides being the habitat of elephants, rhinoceroses, tigers and leopards, is one of the world's great storehouses of tin. The mines near the settlements are extending further afield. This raises a social problem for the Chinese miner. He is above all things a gregarious being, and the height of his pleasure is to eat with his fellows at the teahouse table and then relax with an exciting game of Mah Jong, or to smoke the pipe which is forbidden and dream of the land of his ancestors, to which some day he hopes to return, affluent and respected.

The teahouse of his liking flourishes best in towns; hence the most desirable employment is furnished by the mines nearest to the populous settlement. Before the coming of the jitney the task of keeping mine laborers steadily at work constituted something of a problem, for times would come, especially on pay days, when the Celestial felt the need of more diversified amusement than was furnished by the mining camp. Travel was slow and arduous and the return journey taken with considerable reluctance.

ALL is changed now by the jitney, and week-end trips find hundreds of expectant miners speeding to town, often fifty miles away, to enjoy the glory of the cinema, the teahouse, and haggling with shopkeepers in the traditional fashion, wherein the actual purchase is hardly more the object than the joy of making a shrewd bargain.

Despite her great progress as an industrial nation, Japan is still confronted with primitive problems. The advent of the jitney is helping her, too, to overcome handicaps imposed by nature. The country is extremely mountainous, with few long valleys or river courses, so that new railway construction always involves tunneling. This makes railroad building so expensive that the lines are mainly confined to the coasts. The country is in need of many branch lines to serve interior sections, and the question before the Government is whether these shall be developed as railway or highway routes. To some extent the answer is now being given by motor-buses, which are bringing rapid transit to thousands living off the main lines of communication.

WITHIN the past three years the use of motor-buses has extended to all parts of Japan, so that there are today approximately 750 lines operating. The majority acts as railroad feeders and the service provided is from railroad points into the interior. These lines are profitable, for the movement of people is steadily increasing.

Not many years ago a man who traveled fifty miles from his native village was exceptional; but today everybody travels. The Japanese are great lovers of nature, and during the cherry blossom season long journeys are taken to those sections where the pink and white blossoms are best.

At such times special excursion trains frequently run from city to country. To nearby groves people literally swarm; whole families will go by every possible conveyance and put up with great discomfort, merely to spend an hour among the trees. During cherry blossom season traveling becomes a serious problem on the main railroad between Tokyo and Kyoto, and Nagasaki and Kyoto, for the latter is the old capital and the scene of the annual cherry blossom dance, which every Japanese hopes to see during the month of its performance. Trains are jammed and the improvident person who tries to travel without making reservations far ahead will be disappointed when he tries to buy a berth or seat. The railroad runs special third-class trains between these points, and there is a scramble for places on every train. At each station hundreds of country people wait for hours to get aboard. These are people who have been brought down from the mountains by jitney, their dependence for getting to town.

The desire to go to town is firmly planted in human beings, regardless of race. Cities are lodestones that eventually draw the most unsocial person out of mountain fastness or desert wilderness; for the town gratifies the human need to mingle closely with fellow beings.

THE ease with which such journeys are made is a criterion of the social development of a nation, for, if the effort be great, travel is restricted, with a consequent limitation of social knowledge and experience, in contrast with the richer life of the individuals who enjoy facilities for frequent visits to town.

It is this great human need which has caused the jitney to be so widely adopted in Asiatic countries, which have suffered for centuries from inadequate transportation. It has brought people together, broken down the deep suspicion which village held against village, and at the same time gratified the Oriental love for traveling, a desire that has reached enormous proportions as the result of countless generations of suppression.

Vehicle Operating Costs

DATA regarding the cost of operation of motor vehicles in various sections of the country and on various types of roads is being gathered by the American Automobile Association and its affiliated clubs at the request of the U. S. Bureau of Public Roads and the National Research Council.

A questionnaire is being sent to 300 affiliated clubs asking the club officials to select interested members operating different makes of cars to cooperate in furnishing this data.

The questionnaire is designed to show the type of vehicle used, the manner of its usage, the condition of the roads traveled, the total mileage for the period during which the records are kept, operating charges and the yearly fixed charges, including insurance, State license fees and motor vehicle taxes. Provision is also made for showing the average life of tires in miles and the total cost of repairs, overhauling, etc., during the period.

Remarkable Strides Made in Production of Liquid Fuels from Coal

Greatest development has come through low-temperature system of distillation, but marked progress is noted in other methods. Close relation exists between the phenols and the aromatic hydrocarbons. Experimental results have been encouraging.

MANY people in the automotive industry probably have failed to take notice of the remarkable work which has been done in recent years in connection with the production of liquid fuels from coal. According to an authority on the subject it is now possible to convert from 80 to 90 per cent of the weight of (dry, ashless) coal into liquid fuel. This, of course, does not mean that it can be done on a commercial basis, in competition with other fuels, nor that all of the liquid fuels thus produced are suitable for use in automobile engines. In fact, the percentage of automobile fuel that can be recovered from coal at the present time, even under the most favorable conditions, is only about five, as will be shown later on; but the figures above quoted show the remarkable results that have been obtained in an experimental way.

At a time like the present, when the curve of gasoline prices is exhibiting a downward trend, interest in gasoline substitutes is likely to lag, but we are still confronted by the fact that a survey of our petroleum resources made by the Bureau of Mines some years since, led to the conclusion that if our consumption continued to increase at the then prevailing rate, these resources bid fair to be exhausted within a comparatively short period.

Low Temperature Distillation

The greatest advance in the production of liquid fuel from coal has come about through the development of the low temperature system of distillation or carbonization, which development began about 1910 and was forced particularly during the war period. It is in the nature of things that research work in this line, which aims in the main at the discovery of practical substitutes for gasoline and other petroleum products, should be carried on most intensively in countries having no oil fields of their own but plentiful coal supplies, and so we find that although some of the earliest research work along this line was carried on in the United States (notably at the University of Illinois Engineering Experiment Station) and several plants for the low temperature distillation of coal were built in this country at comparatively early dates, Europe has latterly taken the lead in this work.

We are all more or less familiar with benzol, a liquid hydro-carbon fuel produced from coal which is used as automobile fuel very extensively in Europe and to a slight extent also in this country. Benzol is a by-product of the gas-making and coking industries as they have been carried on up to the present time, that is, of the high temperature distillation of coal. It serves excellently as an automobile fuel, either alone or mixed with other fuels, such as alcohol and gasoline. It has an end point of about 250 deg. Fahr., which is more than 200 deg. lower than the end point of the ordinary gasoline now sold in this country;

it has a materially higher heat value than gasoline, on the volumetric basis, and it permits of using a higher compression in the engine without giving trouble from detonation, and thus obtaining a higher thermal efficiency.

The only thing against benzol is that the amount of it which can be recovered from a certain quantity of even the best coking or gas coal is exceedingly small. According to one writer few coals yield more than 8 kilograms per metric ton of coal, that is, 0.8 per cent, while another states that the distillation of coal tar yields only from 0.1 to 0.2 per cent of benzol, but by "stripping" the gas given off by the coal during distillation the yield can be increased to about 1 per cent.

Constitution of Benzol

Benzol is a mixture of hydro-carbons of the aromatic series whose general chemical formula is C_nH_{2n-6} . The chief constituent is benzene, C_6H_6 ; other members of the series always present in benzol are toluene, C_7H_8 , and xylene, C_8H_{10} . Benzene, being the most volatile, is considered the most desirable member of the series, and specifications for benzol generally fix the minimum percentage of benzene the fuel must contain.

Benzene and the other compounds of the aromatic series of hydro-carbons do not exist as such in the coal, but are formed by the cracking of other hydro-carbon compounds during the distillation process. This is proved by the fact that when coal is distilled at a comparatively low temperature (below 1100 deg. Fahr.) the products driven off contain no benzol. On the other hand, it is pretty well established that members of the paraffin series of hydro-carbons are present in the coal, and when the coal is distilled at low temperatures these are found in the gases and vapors given off.

Formation of Benzol

The process by which benzol is formed during the destructive distillation of coal is probably as follows: Under the heat of the distillation process the paraffin hydro-carbons present, corresponding to the general chemical formula C_nH_{2n+2} are broken up or cracked into the lower members of the series and into olefines, whose general chemical formula is C_nH_{2n} . For instance, one of the lower paraffins formed will be ethane, C_2H_6 , which is a gas at normal atmospheric temperature. On further heating this will split up into the olefine ethylene, C_2H_4 , and hydrogen. The ethylene in turn splits up into marsh gas, CH_4 , the lowest member of the paraffin series, and acetylene, C_2H_2 , which latter also belongs to a series of hydrocarbon compounds of the general formula C_nH_{2n-2} .

Now, benzene and acetylene contain exactly the same proportion of carbon and hydrogen, equal numbers of car-

bon and
of each.
carbon
atoms o
fore sai
from th
tion of
dently
polymer

During
old or h
thalene,
of autom
of moth
is form
In th
gas in
gave th
good de
it woul
the gas
pipes.
it is sc
from th
ered fr
from th
kets fo
ever, a
compari
recover
is com
German
(C_nH_n)
catalyti
naphtha
causing
naphtha
addition
while
conditi
caldron
and un
ence of

The
control
bolic ac
hydroc
to the
nickel
stance,
verted
naphth

The
the by-
process
peratu
cause
ally sr
ture d
ing an
coal in
ence o
view th
distilla
fish) u
call it
The

bon and hydrogen atoms being contained in the molecule of each. The acetylene molecule contains two atoms of carbon and two of hydrogen; the benzene molecule six atoms of carbon and six of hydrogen. Benzene is therefore said to be a polymer of acetylene and can be produced from the latter by polymerization, that is, the combination of a number of molecules into a single one. It is evidently by this process that benzene and other similar polymers are formed during the distillation of the coal.

Hydrogenation of Naphthalene

During the past year or two another by-product of the old or high temperature system of coal distillation, naphthalene, has been utilized in Germany for the production of automobile fuel. Naphthalene is best known in the form of moth balls. Like benzene, it is not present in coal but is formed by pyrogenesis or cracking during distillation.

In the early years of the gas industry naphthalene gave the gas companies a good deal of trouble in that it would separate out from the gas and choke up the pipes. At the present time it is scrupulously separated from the gas, being recovered from the oil distilled from the coal tar. The markets for this product, however, appear to be small in comparison to the amount recovered, and the price is comparatively low. In Germany this naphthalene ($C_{10}H_8$) is hydrogenized catalytically into tetrahydronaphthalene ($C_{10}H_{12}$) by causing each molecule of the naphthalene to take up four additional hydrogen atoms while kept in the molten condition and agitated in a caldron at 350 deg. Fahr. and under about 250 lb. per sq. in. pressure, in the presence of fine divided nickel and an excess of hydrogen.

The Tetraline company, which works this process, also controls another process for converting the phenols (carbolic acid) always recovered from coal tar into naphthene hydrocarbons. This also is done by subjecting the phenols to the action of hydrogen in the presence of finely divided nickel at moderate pressure and temperature. For instance, the phenol cyclo-hexanol, C_6H_7OH , is readily converted into cyclohexane, C_6H_{12} , a member of the olefine or naphthene series, which boils at 174 deg. Fahr.

The Economic Aspect

The above covers the recovery of automobile fuels from the by-products of the old or high temperature distillation process. We will now turn our attention to the low temperature distillation process which was introduced because it gives a greater yield of liquid and a proportionally smaller yield of gaseous distillates. Low temperature distillation is generally considered to obviate cracking and thus to leave the hydrocarbons contained in the coal in their original state, although there is some difference of opinion on this point. As an expression of this view the Germans call the tar produced by low temperature distillation (generally called low temperature tar in English) *urteer*, that is, literally, original tar, and the French call it primary tar.

The economic prospects of low temperature distillation

have been materially improved in recent years owing to the rapidly increasing demand for light liquid fuels for internal combustion engines. At the present time only a fraction of the bituminous coal mined is converted into coke and by-products, much being burned in the original state, or as raw coal, in domestic heating stoves, under boilers, etc. When thus burned a large percentage of the volatile matter contained in the coal passes off unconsumed, with the smoke, and not only is its heat value lost, but it creates a serious nuisance in that it is responsible for the black smoke that often pours forth from the chimneys of furnaces burning bituminous coal.

The wastefulness of burning soft coal in furnaces without having first extracted the valuable volatile matter which it contains has been pointed out repeatedly of recent years, especially in countries which have to import large quantities of petroleum distillates annually.

Perhaps the first to call attention to it was Dr. Rudolf Diesel, the inventor of the Diesel engine. In Germany Diesel engines are commonly operated on an oil distilled from coal tar, and Dr. Diesel advocated that all gas coals be coked. The coke was to be used for heating and power purposes, furnishing a smokeless fuel. Formerly most of the coke used for metallurgical and other purposes was produced in beehive ovens, which allow all of the valuable by-products, such as gas, tar and ammonia, to go to waste. In Germany all coke has been produced in by-product ovens for a long time past, but Dr. Diesel wanted the coking process extended to all gas coals mined.

At a recent meeting of the South Wales Institute of Engineers, D. Brownlie said that Great Britain at present imported 200,000,000 Imperial gal. of light motor fuel annually, but that if all the 150,000,000 tons of coal mined in that country per year were subjected to low temperature distillation, 500,000,000 gal. of motor fuel might be recovered and 75,000,000 bbl. of lubricating oil.

View of the British Fuel Board

The problem is, of course, very largely an economic one. The way the British Fuel Board expresses it in a recent report—"the economical possibility of making fuel oil in this way depends upon there being a market at a reasonable price for the much greater mass of coke that is produced at the same time, and the possibility of the coke being marketable in competition with the raw coal from which it is made depends among other things on the extent to which the large proportion of combustible and other products can be turned to economical account." The board estimates that 70 per cent of the weight of the coal can be turned into coke, 6 per cent into fuel oils and 9 per cent into gas. The oil here referred to, however, is that used in Diesel engines and not the light distillate used in motor cars, which constitutes only the lighter fraction of this oil. It is claimed that the coke produced by the low temperature process is more friable or brittle than high temperature coke, and therefore may not bring the same price.

MORE recent investigations minimized greatly the gasoline shortage scare which swept the country a year or two ago, but the ultimate need for utilization of substitute fuels is still recognized. Development work along this line has already been carried on in many places, and should be encouraged as providing insurance against possible slowing up in production or rise in price of automotive fuels.

Already gasoline substitutes are playing an important part in automotive development in foreign countries, and, consequently, are of considerable interest in connection with our foreign trade.

In this article, an interesting technical summary is given of the results of experimental work in obtaining gasoline-type motor fuels from coal.

The coal tar produced by low temperature distillation differs from the ordinary coal tar in that it is more fluid and has a lower free carbon and a higher hydrocarbon content. It contains no appreciable amount of benzol and naphthalene.

Low temperature coal tar, in addition to hydrocarbons, contains phenols, $C_nH_{2n-1}OH$ (creosote), which must be removed if the oils recovered are to be used as motor fuel, as they are of an acid character. The separation can be effected either by washing the crude tar with caustic soda solution, or by similarly washing the fractions obtained by the distillation of the tar. Pure phenol or carbolic acid, C_6H_5OH , which also figures among the acid products of low temperature coal tar, is of automotive interest in that it constitutes one of the raw materials of bakelite.

Various Uses for Tar Acids

Creosote is largely used for the preserving of wood, and it will thus be seen that there are various uses for the tar acids, but it is possible by chemical means to convert them, at least in part, into hydrocarbons suitable for use as light motor fuel, and particular attention has been given to this phase of the problem in Germany in recent years.

The close relationship between the phenols and the aromatic hydrocarbons can be seen from the general chemical formula, that of the former being $C_nH_{2n-1}OH$ and that of the latter C_nH_{2n-6} , so that it is obvious that in the phenol molecule one of the hydrogen atoms of the aromatic hydrocarbon molecules has been replaced by the radical OH. The reverse operation, therefore, will convert a phenol into a hydrocarbon.

As tending to enhance the practicability of the low temperature process it may be pointed out that creosote from low temperature tar is considered a better wood preservative than ordinary creosote.

When coal tar freed of its acids is distilled it yields a series of oils which are similar to the fractions obtained from crude petroleum. These oils consist mainly of the aliphatic or fatty series of hydrocarbons (paraffins and olefines), both saturated and unsaturated. Most of the oils are not sufficiently volatile for use in low compression engines and in the past these tar oils have been used most extensively as a Diesel engine fuel. However, chemists have at their command a number of means for converting the less volatile into more volatile hydrocarbons. It may here be pointed out that in any particular series of hydrocarbons, the larger the hydrogen content the more volatile the compound, that is, the lower its boiling point.

Two Hydrocarbon Compounds

This relation, however, does not hold when different series are considered. There are two general types of hydrocarbon compounds, the chain and the ring type. In the former the carbon molecules are supposed to be grouped in a straight line and the hydrogen atoms attached by their bonds to carbon atoms. In the ring type the carbon atoms are supposed to be arranged in a circle, the hydrogen atoms being again attached to the carbon atoms. Paraffin hydrocarbons (gasoline) belong to the chain series, benzene and the other benzol constituents to the ring series. The atoms of a ring compound are more closely tied together than are those of a chain compound, and the temperature of inflammation of benzol is in consequence much higher than that of gasoline (about 500 deg. Fahr. instead of 300 deg.).

The most direct process for recovering the light hydrocarbons contained in coal tar consist in distilling the tar at atmospheric pressure and collecting the condensate between suitable temperature limits. The first and best known method for converting the higher into the lower

hydrocarbons is by what is known as the cracking process, which is also employed in the production of gasoline from crude oil or some of its heavier distillates. It consists merely in subjecting the liquid to be distilled to a comparatively high pressure and raising the temperature until distillation takes place under this pressure.

Coal Treated with Ozone

Another process available for converting coal into liquid products consists in treatment with ozone. Coal is subjected to this treatment while under pressure and in the presence of water, to prevent inflammation and combustion of the carbon with the evolution of carbon monoxide. In this way all kinds of coal may be transformed into organic compounds soluble in water. There is very little chance, however, that this process will ever become commercial owing to the high cost of ozone and also because practically the same results can be obtained by treatment with oxygen under pressure. In the oxydation of coal by this process a temperature of 400 deg. Fahr. and a pressure of 700 lb. per sq. in. are used. Fischer thus succeeded in transforming coal into the water-soluble organic compounds benzoic acid, $C_6H_5CO_2H$, and phthalic acid, $C_6H_4(CO_2H)_2$, obtaining a yield of from 40 to 50 per cent of the coal treated. One difficulty connected with the oxydation processes is that in addition to motor fuels they yield a number of at present useless products.

Good Results Obtained

Better commercial results are to be expected from hydrogenation processes, that is, the combination of nascent hydrogen with the molecules of the heavier hydrocarbons, as in the production of tetraline. One such process is known as the Bergius process or berginization. Coal is placed in a 10-gal. steel cylinder containing an agitator and is subjected to a temperature of 750 deg. Fahr. while a current of hydrogen under the enormous pressure of several hundred atmospheres is being forced through the cylinder. The heating is effected by means of a lead bath, which permits of keeping the temperature constant. The hydrogen is circulated by means of a compressor and while in the cylinder it becomes charged with oily products which are separated out in a condenser, after which the excess hydrogen is returned to the cylinder forming the reaction chamber.

The Bergius process is claimed to permit of transforming from 80 to 90 per cent of coal into oils which are similar in character to the fractions which are obtained from crude petroleum. The residue is a dark colored substance composed of carbon and hydrogen mixed with ashes. The reaction can be accelerated by mixing with the coal a substance such as benzene, which, in rendering the mass treated more mobile, facilitates its coming into contact with the hydrogen, which is circulated through the reaction chamber by the compressor. At the same time the nitrogen contained in the coal passes into the ammonical state, forming ammonia compounds which can be easily removed.

Conversion Without Catalysers

By this process it is possible to convert not only the heavy hydrocarbons but also the phenols of the heavy oils from coal tar into light motor fuel without the use of catalysers.

Another hydrogenation process designed for the same purpose is the Fischer and Schrader, which consists in passing the vapors of the heavy oils, mixed with hydrogen, through iron tubes tinned on the inside and maintained at a temperature of 1380 deg. Fahr. This process yields benzene and toluene. Starting, for instance, with xylenol, $C_6H_4(CH_3)_2OH$, on which the hydrogen is

made to act, the two methyl groups (CH_3) and the hydroxyl group (OH) are eliminated, the former being converted into marsh gas (CH_4) and the latter into water (H_2O). The result is benzene, with a theoretical yield of 64 per cent of the xylene treated. The best temperature for this process lies between 1300 and 1475 deg. Fahr.

In Germany the subject of light motor fuels from coal tar has been investigated chiefly by Prof. Franz Fischer, who had charge of the fuel research work begun during the war. Professor Fischer claims that it is now possible to obtain 5.25 per cent of the weight of good gas coal in the form of light motor fuel. This yield, however, can be obtained only by applying rather involved processes.

Various Items in Total Yield

The total yield is made up of a number of items as follows: By stripping the gases of distillation, 0.35 per cent of light fuel can be obtained. Ordinary distillation of the tar at atmospheric pressure yields 1 per cent of spirit. Cracking the tar, that is, subjecting it to a high pressure and a high temperature and then distilling, yields another 0.8 per cent. The tar acids can be partly converted into crude benzol by a catalytic process consisting in passing the acids through tinned iron tubes partly filled with turnings of tinned iron, maintained at a temperature of 1300 to 1500 deg. Fahr., in the presence of an excess of hydrogen. This is really the most efficient of the different processes, as it yields 2 per cent of the weight of the coal. Finally, 1.20 per cent is obtained by the conversion of the unsaturated hydrocarbons into alcohols.

In England a system of distilling coal in vacuum has been developed experimentally. In this way the good effects of low temperature distillation can be still further improved, as with a reduction in pressure the temperature required for distillation is lessened. In the high temperature distillation process used up to the present time the temperature ranges from 1100 deg. Fahr. up to 1800 deg.; in low temperature distillation carried on at atmospheric pressure the temperature is carried up to 1100 deg., while in the vacuum process the temperature is limited to about 930 deg. If the tar obtained from the coal in vacuum distillation is fractionated to 570 deg. Fahr. about 50 per cent of soft pitch is obtained and 50 per cent of oils of which 40 to 50 per cent are unsaturated hydrocarbons and about 40 per cent liquid naphthenes and paraffins, mainly the former. From 12 to 15 per cent of tar acids are recovered and about 7 per cent of aromatic hydrocarbons.

Pictet and Bouvier Experiment

In France experiments in vacuum distillation have been carried out by Pictet and Bouvier, who when operating under a pressure of from 0.6 to 0.8 in. of mercury at 840 deg. Fahr. obtained 60 lb. of tar from 1500 lb. of coal. Tar first began to come off at 212 deg. Fahr. Its specific gravity increased as the process continued, and toward the end it exceeded 1. In this connection it is interesting to note that the specific gravity of standard coal tar varies from 1.1 to 1.2. Only traces of oxygenated compounds and 0.2 per cent of bases were found.

After these products had been eliminated the unsaturated hydrocarbons were removed by shaking with sulphur dioxide. The saturated hydrocarbons remaining were then fractionated at atmospheric pressure. Members of the naphthene series (C_nH_{2n}) from C_6H_{12} to $\text{C}_{12}\text{H}_{24}$ were isolated, the boiling point of the former being 277 deg. Fahr. and that of the latter 440 deg. No naphthalene was present. By cracking this vacuum tar Pictet obtained coal gas and benzenes, naphthalenes, anthracenes and pyridine bases, all compounds found in ordinary coal tar. The distillates of low temperature tar are unstable and quickly darken at normal temperatures.

Parr and Olin of the University of Illinois Experiment Station, who distilled dehydrated low temperature tar, obtained 17.2 per cent of light oil (below 410 deg. Fahr.), 52.7 per cent of heavy oil (410-617 deg. Fahr.) and 30.1 per cent of pitch. The light distillate had a disagreeable odor, was of amber color and rapidly darkened on standing. Contrary to other experimenters with low temperature tar, Parr and Olin got some benzenes, viz., 0.38 per cent of crude 90 per cent benzol and 1.33 per cent of toluol. The term per cent generally used to specify benzol refers to the proportion which distills over up to 212 deg. Fahr.

In the experiments here referred to that fraction passing over between 167 and 203 deg. Fahr. was considered to be benzol and that passing over between 203 and 257 deg. toluol.

That members of the benzene or aromatic series are formed only at higher temperatures was confirmed by Whitaker and Crowell, who found that with Pennsylvania bituminous gas coal xylene and toluene began to form at 750 deg. Fahr. and benzene at 930 deg., but that the maximum yields are obtained at materially higher temperatures as follows: Benzene, 1475 deg.; toluene, 1390 deg.; xylene, 1110 deg. As these temperatures are beyond the limit of low temperature distillation, it becomes plain why low temperature tar contains little of these members.

German Research Effective

The work of Fischer in Germany referred to in the foregoing was done partly in collaboration with Glund. They compressed the gases formed during the distillation process in paraffin oil or liquified them so as to catch all of the light hydrocarbons, and the mixture thus obtained was fractionated. The first drop came over at 70 deg. Fahr. In order not to crack the heavier members the heavier fractions were either distilled in a steam still or in vacuum.

A quantity of 150 kg. of Lohberg gas coal was started with and this yielded 1.23 per cent of light hydrocarbons. The fractionation gave the following results:

Temp. Range	Per Cent	Density
70-140 deg. Fahr.....	11	0.658
140-212	15	0.720
212-263	16	0.768
263-375	40	0.805
Over 375	10	....
Loss	8	....

The fraction distilling over at 70-140 deg. contained the paraffin hydrocarbons pentane and hexane, and unsaturated hydrocarbons were also present. The 140-212 deg. fraction contained paraffin hydrocarbons, naphthenes and a small quantity of products of low hydrogen content. No benzene was found and only a trace of nitrogen and sulphur compounds. The 212-263 fraction consisted of a mixture of paraffins, naphthenes and complex aromatic hydrocarbons. In the viscous oils solid paraffins were present.

Low Temperature Tar Produced

Low temperature tar is said to have been first produced on a commercial scale in the Saar Basin. Saar coal gives an average of 5 per cent tar on the weight basis, while Upper Silesian coal yields from 6 to 9 per cent. In the Saar the low temperature tar is first dehydrated and then worked up. This tar yields 30 per cent (Diesel) engine oil and 33 per cent lubricating oil, the rest being pitch and loss. During the first months of 1918 the monthly production of low temperature tar in the Saar was 150-200 tons, but by the end of the war it had increased to 1260 tons per month.

Self-Contained Kerosene Carbureter Developed in England

Exhaust-heated manifold not needed with new British product. Is smaller than other units of this type and is similar in some respects to Packard fuelizer. Engines fitted with this equipment claimed to consume less fuel and produce more power.

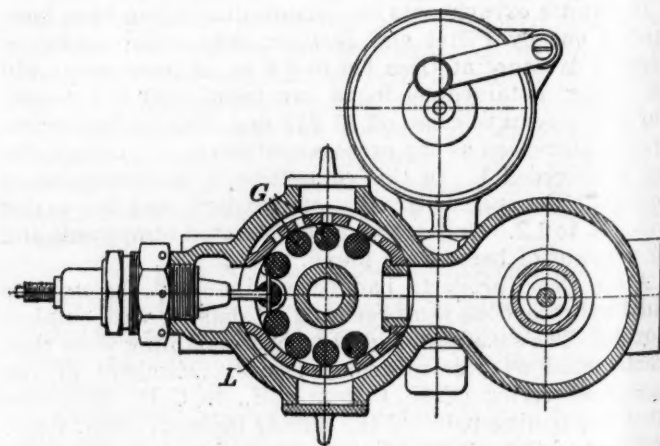
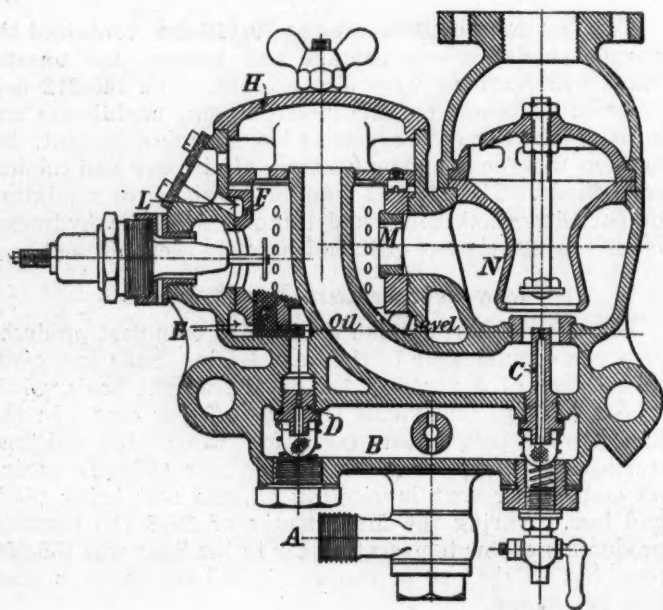
A KEROSENE carbureter based on a principle not unlike that of the Packard fuelizer has been developed in England by Commercial Cars, Ltd., well-known truck manufacturers. We take the following description of this device from *Engineering*. The device is considerably smaller than other kerosene carbureters and is self-contained, that is, it does not require so-called hot-spot or exhaust-heated manifolds. Referring to the sectional view, the kerosene tank is connected to the union A and is controlled by an ordinary carbureter float. From the float chamber the fuel travels into a passage B in the body of the main casting, to which are connected the main jet C and the auxiliary jet D. The main jet terminates just above the level at which the float valve maintains the oil, but the latter rises through the auxiliary jet into the bottom of a chamber E. Fitting into the sides of this chamber is a casting F, the bottom of which is pierced with a number of holes, each of which is filled by an asbestos wick G. The lower ends of these wicks dip into the kerosene in the chamber E.

To start the engine from the dead cold condition, the cover H is removed, by loosening the wing-nut which holds it, so that air has free access to the inside of the casting F. A high-tension spark is then passed from the sparking plug to a piece of metal surrounding the wick directly beneath the plug. This ignites the wicks, which are allowed to burn for a minute or so, to warm

the casting. The cover H is then replaced and the engine is ready to be started. The spark is again switched on and the engine cranked round. The operation of cranking draws air through a small plate, which is perforated with holes. This air is separated into two portions. One passes directly into the interior of the cover H, down through the curved pipe and upward past the end of the main jet C. This is the main vaporizing air which draws the kerosene out of the jet and carries it upward in the form of mixed vapor and spray.

THE other portion of the air is led to an annular space L surrounding the casting F, and passes into the interior of the casting through the numerous small holes drilled through its walls. The presence of this air keeps the wicks burning after they have been re-lighted by the spark. A small part of the heated products of combustion pass upward into the cover H, and mix with the pure incoming air to raise its temperature. The major part, however, passes out through the passage M at a very high temperature, and being deflected by the casting N, meets the kerosene spray as it emerges from the jet and completes its vaporization.

The baffle above the jet assists the mixture and forces the vapor into contact with the walls of the casting N, which are maintained at a high temperature by the hot gas or flame surrounding them. The mixture eventually passes away through three ports in the dome-like cap



Vertical and horizontal sections through the Commer kerosene carbureter

and thence to the throttle-valve. The mixture, and the additional air required for combustion, are controlled by separate butterfly valves, so connected that a richer mixture is automatically provided when the engine is "idling," and the mixture strength may also be increased above the normal under overload conditions.

IT is claimed that the engine can be started within a minute or so from cold, without the use of gasoline or any means of auxiliary heating. As soon as the engine is firing, the spark in the vaporizer is switched off, as the passage of air over the wicks is sufficient to keep them alight. Should they be blown out by a back-fire, or become extinguished from any other cause, they can be instantly re-ignited by switching on the spark momentarily. After the engine has been running long

enough to heat the water in the radiator appreciably, it may be stopped and re-started after an interval amounting to as much as a couple of hours, without removing the cover of the carbureter.

In connection with this description there were published results of comparative tests made by the manufacturers of the carbureter on one of their truck engines, with a standard gasoline carbureter and the kerosene carbureter here described, using the respective fuels, which show that with the kerosene not only did the engine produce 2 per cent more power, but it consumed 13.2 per cent less fuel under full throttle conditions. These results, if they can be substantiated, are remarkable, because it is the common experience that with kerosene the power of an engine is reduced and the consumption materially increased.

New Automatic Threading Machine

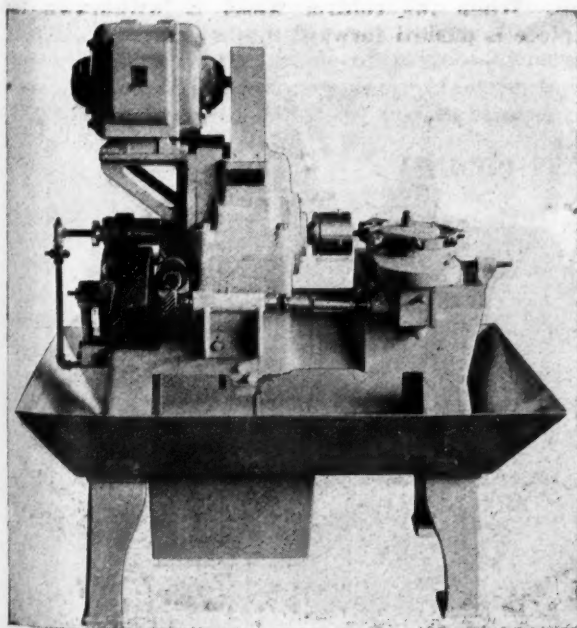
AN automatic single purpose threading machine has been added to the line of threading tools manufactured by the Rickert-Shafer Co. The machine illustrated herewith was especially developed for threading spark plug shells.

The cylinder carrying the die-head revolves in two annular ball bearings and is moved toward and away from the work by a cam at the rear. On this particular machine the work is fed onto an eight-station turret, which indexes automatically, bringing a new piece into position every time the die-head advances. After the thread is cut the piece is automatically ejected. The revolving type die-head is opened and closed automatically.

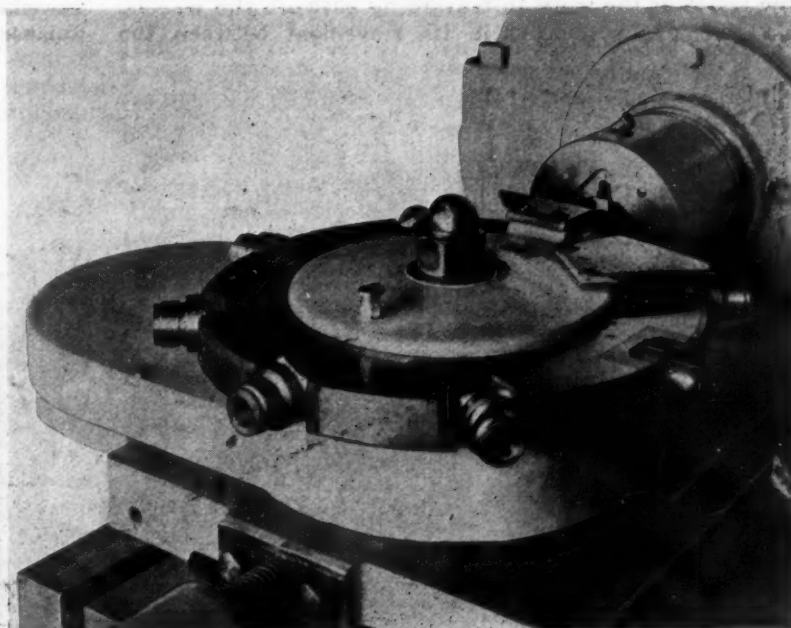
Fixtures and cams for different threading operations can be supplied with this machine. These machines are now in use on connecting rod bolts, steering arms, spark plugs, electric connectors, pipe plugs, etc. The machine can be driven either by belt from a countershaft or from a motor. When a motor is used the drive is by a silent chain. The second view is a close-up of the turret on

the spark plug machine. This machine, we are informed, threads plugs at the rate of 28 per minute, and one operator can keep two machines going.

DANISH railroad commission is at present investigating the question of the relative advantages of motorbus and railroad transportation for certain districts in the kingdom, particularly in connection with several private railroad projects which are being promoted. The investigation has been extended to Sweden and Norway, where there are quite a number of automobile services operating on a regular schedule. In the Bohuslan district of Sweden the Government pays substantial subsidies to a number of automobile routes. The Norwegian Government pays 400,000 crowns annually in subsidies to such lines, and the Post Office pays a similar sum. In Denmark such high rates are proposed for motorbuses, with a view to the cost of road maintenance, that it is feared this will jeopardize the success of the business.



Automatic threading machine for spark plug shells



Turret of threading machine

Tilting Feed Feature of Centerless Grinder

New product has wide range of adaptability. Speed of control wheel determines speed of work passing through the machine.

THE centerless grinder has come into wide use for grinding cylindrical and other simple parts of automobiles, because of its economical advantages. As compared with grinding between centers, the time taken up in loading the machine and adjusting the wheel to the work is eliminated; heavier cuts can be taken because the work is supported by the control wheel at the point of grinding; extra operations, such as centering and the inspection which follows it, are eliminated, and the amount of stock to be removed by grinding can be reduced. Among the more important automotive parts finished on the centerless grinder may be mentioned piston pins, pushrods, shackle bolts, valve tappets, bearing rollers, valve lifter roller pins, knuckle pins, etc.

A new centerless grinder has been placed on the market recently by the Cincinnati Milling Machine Co. This machine is claimed to have a wide range of adaptability, owing to the tilting feed or control wheel bracket and the control wheel speed change box with sixteen changes of speed. The speed of the control wheel determines the rotary speed of the work passing through the machine, and the inclination of the control wheel determines the feed or lap per revolution of the work. On such work as truing a piston pin which is out of round, a small feed per revolution and therefore a small angle of inclination of the control wheel is desirable. On the contrary, if it is desired to straighten a crooked pin, a wide lap per revolution is used.

Cylindrical work, without interfering shoulders, is ground by passing transversely between two opposed abrasive wheels, while work with shoulders is ground by the "straight in" feed method. Following is the method of grinding straight cylindrical work on this machine. A 20-in. grinding wheel is mounted at the left end of the main bed, and opposite it a 12-in. grinding wheel known as the control wheel. This latter controls the speed of the work in traversing between the wheels. The work is supported in its movement between the

wheels by a work-support blade, mounted on a work rest between the two wheels. The top of this support blade is parallel to the grinding wheel spindle. The control wheel is carried in a bracket which can be swung about a horizontal axis and clamped in any angular position. In order to produce a finished piece of work it is often necessary to pass it more than once between the wheels, the number of passes being determined by the amount of stock to be removed, the roundness and straightness of the work, the quality of material and the limit of accuracy required. Sizing is accomplished by moving the housing carrying the control wheel forward on its slide to compensate for wheel wear. The work rest which carries the work-support blade is made universal, so as to take care of work of different diameters.

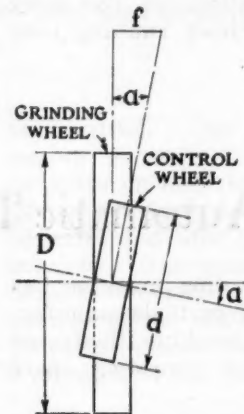
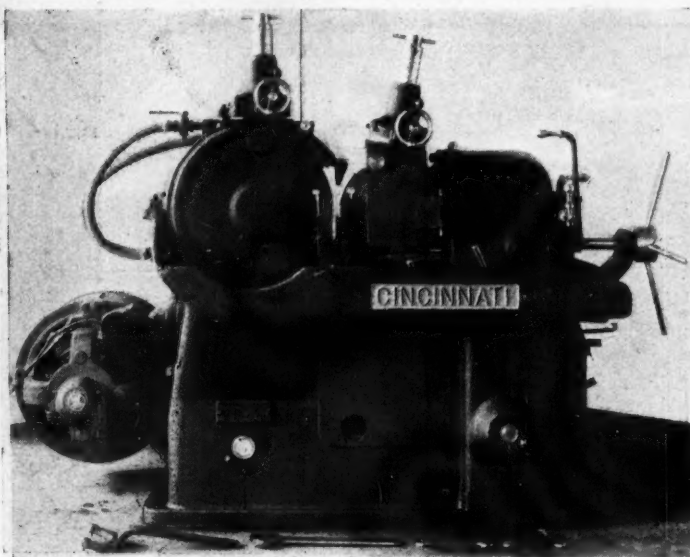
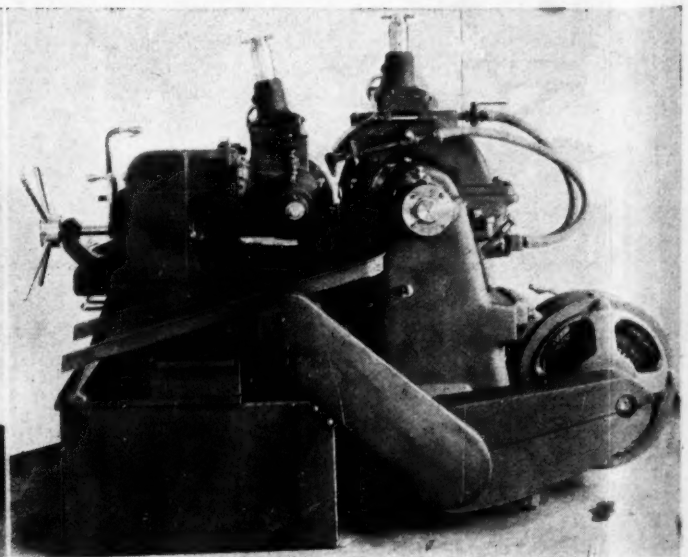


Diagram showing relation of control wheel to grinding wheel

Work having shoulders is ground by the "straight-in" feed method. Where the portion to be ground is not more than 4 in. in length a shoulder-grinding work rest is required, in addition to the regular equipment of the machine. This work rest has a lever, and a 90 deg. motion of this lever by the operator's right hand moves the control wheel housing forward or backward a distance of 0.030 in. When the wheel is withdrawn the piece of work to be ground is laid upon the angular support blade and located endwise by an adjustable stop. As the lever is brought down the control wheel is moved forward and the work pushed against the grinding wheel, the desired size being reached when the lever has made its full movement. When the control wheel is withdrawn the finished piece is pushed forward into a pan.



Front view of Cincinnati centerless grinder



Rear view of grinder



The FORUM



French Expert Criticizes American Brakes

Henri Perrot, owner of patents covering four-wheel brakes used extensively in Europe, believes recent designs to be imperfect.

Editor, AUTOMOTIVE INDUSTRIES:

Trouble lies ahead of American manufacturers if they go into production on some of the front-wheel brake designs recently brought out and described in AUTOMOTIVE INDUSTRIES. While a few of the designs are good, many fall into the mistakes which were made in Europe when front-wheel brakes became a practical proposition immediately after the war and which were only eliminated after long and careful practical tests had been carried out.

Although there was considerable accumulated experience behind the first front-wheel brakes built in France in 1918, the designs brought out at that time had to be considerably modified in view of road tests carried out by such firms as Hispano-Suiza, Delage and Talbot-Darracq. American engineers as a class appear to be at the same point as French firms in 1918, and, like them, may be expected to have to spend a couple of years experimenting before they develop front-wheel brakes which can be placed in the hands of the ordinary user with perfect safety.

Front-wheel brakes should not be studied as a brake problem only. Suspension and steering are so intimately linked up with brakes on the front wheel that the three must be considered as one problem. In the designs brought out in America it is rather surprising to find an almost entire absence of servo mechanisms. In France, where experience extends over 20,000 cars of various makes in the hands of private owners, it has been demonstrated that some sort of servo mechanism is absolutely necessary for all but light and comparatively slow cars.

HENRI PERROT.

Better Brakes Advocated

Editor, AUTOMOTIVE INDUSTRIES:

In an article appearing in a recent issue of your paper, I noticed a point in reference to front wheel brake design which has apparently received comparatively little consideration; that is the relative deceleration obtained with four-wheel brakes as compared to that of rear-wheel brakes only. One contributor states that four-wheel brakes give approximately double the deceleration of two-wheel brakes.

This immediately raises the question as to whether or not such quick stopping is really desirable, not only from the standpoint of comfort, but of safety as well. If a car going at a speed of 30 m.p.h. could be stopped in a distance of ten ft., the resulting strains on all parts of the mechanism, together with the discomfort of the passengers, would render such a condition prohibitive. It has been found that a good, safe stopping distance for this

speed is about 75 ft. There are quite a few well-known cars on the market today equipped with brakes on the rear wheels only that can do better than this. Therefore, if braking through the rear wheels only produces the desired effect, why add another set of brakes to give a deceleration that is not required?

Another point to consider is that of equalization. It is an obvious fact that the brakes on the right and left sides of a car must be perfectly equalized in order to avoid skidding action. It is well known, but not generally admitted, that nearly all equalizing devices now on the market are practically worthless. No matter how perfectly they may be set up in the shop, they do not function properly after the car has been driven but a very short distance. If it is then so difficult to equalize two rear-wheel brakes, it follows of necessity that two-front wheel brakes offer the same difficulty. How many more complications arise then, when one tries to equalize between two front-wheel brakes and two rear-wheel brakes when neither set is itself equalized?

The question of equalization causes us naturally to turn to the propeller shaft brake. This is a step in the right direction, but, so far, manufacturers have not gone far enough. If one admits that a differential "differentiates," then it is obvious that a brake operating through the differential must be absolutely and perfectly equalized. In practically all cars having a propeller shaft brake, this brake has been mounted at the forward end of the shaft, just back of the gearbox. Why this should have been done is not apparent, as the full breaking torque has to be transmitted through the universal joints and long propeller shaft.

The proper place for a propeller shaft brake is *back* of the rear universal joint and just in front of the differential. This gives the smoothest possible action, perfect equalization, and removes all unnecessary strains from the universal joints and shaft. The writer has had personal experience with a brake of this type that has run for over 30,000 miles as a service brake, and has not required the slightest bit of adjustment. The wear on the lining is so small that it can hardly be seen, due to the very light pressure required to attain sufficient braking action. The original paint is still on the drum, showing that the heat generated was not excessive.

This, to my mind, is the answer to the brake question. Let us not introduce more units and further complications in order to camouflage a bad condition, but rather let us simplify and improve what we already have. The whole question concentrates upon one fact:—Do not try to build more brakes, but rather try to build *better* brakes.

ALBERT H. LANGENHEIM,
Chief Engineer, The Vig-Tor Axle Co.

Promotion From Within Is Good Policy

It develops good-will
and enthusiasm; men in
ranks can be trained

By Harry Tipper

WHO are you figuring on for Johnson's place, Jim?" queried President Billings of the Planet Motor Car Company, as he sat with his sales manager discussing some of the detailed affairs of the business in which both of them were vitally interested. "We should have that matter settled as soon as possible because we do not want to have our sales organization weakened by any lack of directing personnel at this time."

"No, but I haven't been able to make a decision yet," Jim Chance replied. "Madison would make a good man except that he is a little slow; then Staley has come up a good deal lately. He is a brilliant man in some ways and he is full of ideas, but I am not sure that he would be stable enough for our purposes. Then, both these men are somewhat stubborn, they have a good many ideas of their own and they are apt to fight for them pretty hard when they think they are right. Of course that's fine up to a point, but it is necessary for some one to have the deciding voice and I do not feel that they believe thoroughly in our methods of carrying on our sales work."

WELL, of course, that presents some difficulty," Billings put in, "but I have heard you express the notion that you wanted men of initiative and ideas in your organization. In fact, it has been a favorite saying of yours and is, I believe, one of your stock arguments when you are hiring any new man. Of course, you cannot get men of ideas unless they are liable to disagree with your policy every once in a while, so that the reasons you mention don't appeal to me as very pertinent. Apparently you are not sold on the idea of promoting these men. What other thoughts have you in mind?"

"I had thought that we should at this time consider only men of thorough experience," returned James Chance. "It seems to me that we cannot afford to experiment just now with all the problems we have to face. A man who has done this job for some one else would be practically a safe bet for us and I have about given up the idea of promoting any of our men in favor of hiring a man from the outside; someone who already has had experience in similar work and is familiar with it."

"Of course, you have some one in mind?" inquired the president.

"Yes. I was thinking of Dan Terhune, who has been the assistant sales manager for the Sunset Company for five years. I expect you know Dan yourself. Short fellow, with sandy hair and always full of pep. Just like a dynamo for action. He has made quite a record for himself in the Sunset company and I am sure I could get him on terms which would be agreeable. In fact, I have already talked with him tentatively."

PRESIDENT BILLINGS of the Planet Motor Car Co. talks with his sales manager about a vacant position in the organization and takes the opportunity to get across some sound business philosophy.

"You may be right, Jim," the president replied, "and I do not want to throw any obstacles in your way, but I think you ought to look the matter over before you get committed too far in the case. In the first place why should Terhune want to come with us as assistant sales manager with little better terms if he has done such remarkable things in the Sunset company? Then, again, how do you arrive at the conclusion that such a man would not be an experiment?"

DO you remember the time I talked over with you coming with the Planet company? You were with a big outfit then and we were just a small organization. It did not look to me as though I could interest you in the proposition and I don't believe that I could have done it if your old company had seen fit to promote their own men and make the experiments with them.

"I can still remember the way your loyalty to that outfit had gone by the board when you heard that they had hired John Comstock for the job for which you had been training ever since you had started with the company. They should have seen you, but they had a difficulty in deciding that you had all the qualities they needed and they thought they would find them in Comstock. He was a much bigger experiment than you would have been, as you and I know. Also, I might remind you of the fact that several of their branch managers got out in consequence of that same change."

"Of course that was a good deal different," Chance answered, "from this case we are considering for our own organization, although I admit that it is a bad thing to go on the outside for a man when you can promote one of the men on the inside. In fact, that's the way I approached the matter in the first place, but I must admit that I did not find what I wanted when I looked around our own shop and I finally got the notion we had better go outside than get into any question about it."

YOUR alibis are good, Jim," the president smiled as he spoke, "although the golf game should have taught you the value of alibis. But the fact of the matter is that you have not faced this question squarely."

"What are you to do if you don't promote those who are younger and are growing up in this organization? How do you suppose they are to become big men, if no one has any faith in them or enough belief in themselves to experiment as you say. You were nowhere near as big a man when you came with the Planet Motor Car Company as you are today and if your old company had had any idea that you could operate on such a scale they would have been only too anxious to keep you in the concern."

"You know that no man is a hero to his own family. They are pretty close to him and they see all the little faults that get more annoying every time they get into the conversation or the contact. They do not like the way you part your hair and it becomes a very definite source of difficulty after a while. They remember your boorish manners and the idea that you could develop into anything with all those handicaps is likely to be greeted with grave doubts by any group as familiar with you as that.

"THE office is a little like that, Jim; you and I appear to be big men to the fellow on the outside who is employed by a big company. They do not know us quite so well as our own men, who feel that they can criticize us quite freely because our faults become pretty plain in a few years of daily operation side by side.

"It is a good thing we can protect ourselves from most people so that they do not see our little whims and foolishness, but we should not fall into the same mistake and suppose that some fellow from the outside can come in to our shop and make a big showing, just because he looks bigger to us than the people we know so much better.

"He may be a big man, but Jim, we should be ready to promote our own men, even if they do not appear to us to be perfectly fitted for the job. What is your job, any way, Jim, if you cannot bring up men so that they will grow into the bigger places until they eventually supplant you and me as heads of this organization?

"The principal job of the executive is to create bigger men out of his own group and to encourage these men

to grow by trying them out in all the bigger jobs that come along.

"I have a notion that some of these days a wise writer on business will find out that the job of an executive is not to put ideas into a business and trying to get a lot of men who will work out those ideas like the puppets at the marionette show, but that the real job is to collect all the good ideas that are floating around in the heads of those in the organization so that the volume of brain power can be put to work and made to effect its result, in the product and processes.

"Some executives I know seem to think that the ideas should originate in themselves and that all the other people are useful for is to put the ideas to work. The ideal executive will be the combination of the engineer and the judge, who will collect ideas, encourage them, judge them and blue print the methods of putting them into coordinate operation.

"DO you suppose that Smith, the man who played the violin so skillfully in our orchestra last winter is putting all the brains into the drafting work he is doing. No! If he can get sufficient skill to do that with a violin he can get a lot more brain into any other job where he is encouraged to put it in, instead of simply carrying out with mathematical precision something which has been already laid out.

"It is the business of the executive to arrange an organization so that it grows ideas for him to analyze and put into development. Your ideas won't count tomorrow when the practice changes, but your ability to encourage ideas, which will count, will keep you as the leader."

Kissel Announces New Coupe and Roadster

A NEW four-seated coupe and a new speedster have been added to the Kissel Motor Car Company's line for 1924. These bodies, together with the "tourster," the phaeton and the brougham-sedan, which are continued, are mounted on the same standard "fifty-five" chassis used this year.

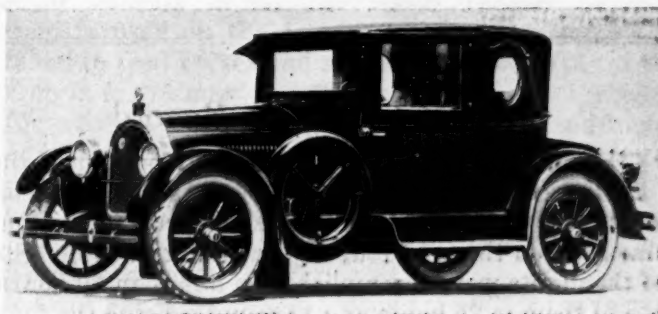
In general the lines of the coupe are similar to those of the sedan. The features of this body include slightly rounded rear corners, elliptical windows in the rear quarters, which have also curved metal bows for decoration, a three-quarter length step, full crowned fenders and spare tires mounted on each side of the body between door and front fender.

The speedster follows earlier models of the same type in general appearance. It is characterized by a high cowl and rear deck and a low seat, the back of which carries a folding top that hugs the body closely when down. There is a step opposite the door and a second step in the corner just forward of the rear fender. A one-piece windshield is fitted.

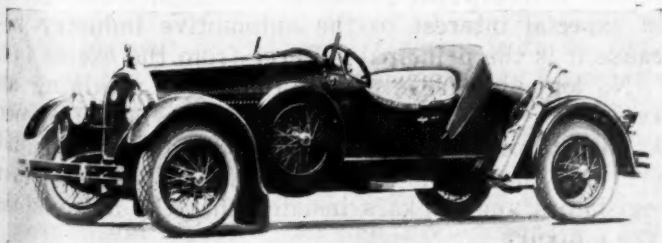
Graphite bronze bushings are used on various chassis

parts and a side play adjustment is provided to prevent rattle at the spring shackles.

The engine is the same as that which has been used successfully for the past three years.



Novel design features new coupé



New Kissel roadster

THE growing importance of chromium in the manufacture of iron and steel is evident from the statement that the consumption of the metal in the United States increased from 65,000 tons in 1913 to 152,000 tons in 1920; while in 1921, in spite of the depression in trade, it was 110,000 tons. It is estimated that of this quantity 40 per cent went into the manufacture of ferrochrome, 35 per cent into refractory materials and 25 per cent into chemicals.

Chrome nickel steel is largely used in automobile manufacture for transmission parts, chrome steel for the balls of ball bearings and silicon-chromium-iron alloys for parts exposed to high temperatures.

AUTOMOTIVE INDUSTRIES

THE AUTOMOBILE

Reg. U. S. Pat. Off.

PUBLISHED WEEKLY

Copyright 1923 by The Class Journal Co.

Vol. XLIX

Thursday, August 30, 1923

No. 9

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
David Beecroft, Directing Editor

U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT

Harry Tipper, Manager

EDITORIAL

James Dalton, Editor
Norman G. Shidle, Managing Editor
P. M. Heldt, Engineering Editor
Herbert Chase, Engineering Editor

DETROIT OFFICE

J. Edward Schipper

WASHINGTON OFFICE

26 Jackson Place, N. W.

BRANCH OFFICES

Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—317 Fort Street, West, Phone Main 1351
Cleveland—538-540 Guardian Bldg., Phone Main 6432
Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189
Indianapolis—1212 Merchants Bank Bldg., Phone Circle 8426

Cable Address.....Autoland, New York
Long Distance Telephone.....PENnsylvania 0080, New York

United States and Mexico.....One Year, \$3.00
Extra postage west of the Mississippi River on account of Zone Postage Law 0.50
Canada One Year, 5.00
Foreign Countries One Year, 6.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Air Mail Makes a Record

THE present reliability of the airplane and of the aircraft engine was again demonstrated conclusively last week when air mails ships crossed the continent seven times in four days without mishap. Six of the flights were accomplished in less than 30 hours, one of them in 26 hours and 14 minutes being the fastest transcontinental trip ever recorded in the history of man. The achievement will rank with that of the recent 27-hour non-stop flight in convincing the general public of the safety and reliability of air travel.

More important even than the performance of the plane itself is the careful organization which preceded the flight. The Post Office Department is said to have been working for over a year on the night flying problems involved. The development of adequate night flying signal facilities between Chicago and Cheyenne is given as the chief factor in making the attempt successful.

This emphasizes very strongly the necessity, recognized by experts for some time, of providing proper

ground organization for commercial aviation. Only through the building up of sufficient landing fields of adequate course lights for night flying and of other similar improvements can civil aviation grow as rapidly and as fully as its possibilities for usefulness warrant.

What the Railroads Need

THE National Industrial Conference Board, whose activities are directed by Magnus Alexander and which is best known because of its periodical surveys of the cost of living, has made an independent survey of the railroad situation which, it says, "has attracted wide attention because the Conference Board serves no special railroad interest and its experts went at their task unhampered by prejudices of any kind."

This report indicates that "hostile and more restrictive legislation" at the next session of Congress "would be calamitous to the welfare of the roads if it is possible for them to work out their rehabilitation under their present managements," and "it is fair to assume that in the majority of cases private operation and management will be able to see the problem through."

This is a sentiment with which the automotive industry will concur.

The report takes up "acute" and "chronic" complaints from which the carriers are suffering and considers them in detail, suggesting remedies. One suggestion is "proper division of highway taxes so that motor truck owners and railroads should pay their fair share."

The automotive industry also will concur in this statement, provided the basis for the division is not determined by the railroads themselves.

It has been found, says the report, that "the railroads have failed to sell themselves properly to the public in the face of great efforts which it was hoped would result in better understanding."

This is undoubtedly true and it will continue to be true until the carriers abandon their archaic publicity methods, which tend to arouse antagonism rather than sympathy, and learn something about the viewpoint of the average man.

War Taxes Should Go

AMONG tax law reforms advocated by the Chamber of Commerce of the United States is repeal of the remaining war excise taxes with the substitution of a sales tax to provide any surplus revenue which may be needed. This proposal, which has been presented with several others to President Coolidge, is of especial interest to the automotive industry because it is the principal sufferer from the excise tax.

No logical defense can be found for retaining an excise tax upon automotive products when it is not applied to other manufactured goods in general and every day use. It is a hang-over from the days when legislators and bankers insisted that the automobile was a luxury.

The excise tax certainly should be repealed because

it is unfair and discriminatory. If a sales tax is the only alternative, however, the outlook for its removal is not so bright. The complexion of the next Congress will be more radical than it has been in a good many years and it is not likely to formulate taxation measures which will fall upon the mass of the people.

Farm and other "blocs" will be all powerful and farmers have manifested a distinct aversion to a sales tax. They have troubles of their own making both ends meet and they are not specially concerned about who pays the bill for keeping the wheels of government in motion so long as it does not involve them any more heavily.

Advocacy of a sales tax is likely to arouse even less sympathy than it has heretofore, but a sense of fairness should lead to the formulation of some substitute for the discriminatory automotive excise tax.

Used Car Situation Satisfactory

NOTWITHSTANDING the alarm felt earlier in the season, the end of August finds the used car situation considerably better than it was a year ago and not nearly so serious as it had been expected to be. The better class of dealers is having little trouble and quite a few of them are making money on used cars. Stocks are comparatively low and demand continues good, especially for closed models.

While this gratifying condition is fairly general, many dealers still are suffering because of the necessity for trading. They are the representatives of companies which do not stand in the front rank in popularity and they often are compelled to grant excessive trading allowances in order to make sales. The fault is not altogether theirs and they are entitled to all the support and assistance their factories can give.

Whatever improvement has come about in the used car situation has been due to better business methods on the part of dealers. They are refusing to buy at a price which will not permit re-sale without a loss and they have learned that this re-sale price must include an allowance for overhead.

Good business judgment and fair methods of competition seem to be the only palliatives found thus far for the used car difficulty, but these are serving their purpose. All that has been said and written on this vital subject has been worth while, therefore. This is no time, however, for manufacturers to relax their efforts at dealer aid and education. Only eternal vigilance will prevent the repetition of serious conditions. If there should be a sharp slowing up of general business, stocks would soon pile up again.

England Seeks Tire Tariff

AN element of industrial tragedy is to be found in the fact that while American and French tire makers are dependent in large measure upon British producers for their supply of crude rubber, the tire manufacturers of England are in an almost desperate plight because they have been unable to meet the competition of American and French makes. Confirmed free traders as they are, the English are de-

manding the protection of a tariff wall against the Americans.

Several members of Parliament have brought up the question and the Government spokesmen have replied that it was being given serious consideration. It is asserted that standard size tires and tubes are being sold in England at a manufacturer's price of about 40s, while it costs 46s 9d to produce the tires in British plants. Nearly 10 per cent of the English tire makers are out of work and are receiving government doles.

Americans who are familiar with the gallant struggle Great Britain has made to overcome the economic difficulties which have confronted her because of the war will feel nothing but regret at the plight of the automotive industry in that country. If the United States, with all its prosperity, was justified in raising a tariff wall to protect its industry and its agriculture, certainly no fault can be found with English tire makers for demanding similar protection.

It will not be fair, however, to impose a duty on American made tires and continue to admit free those of French manufacture. All that manufacturers on this side of the Atlantic ask is a square deal. France now has 40 per cent of the world's export trade in tires while the United States has only 25 per cent.

Cotton Belt Offers Good Market

EFFORTS now are being made in a good many quarters to minimize the seriousness of the farmers' situation, but it must be confessed that most of the arguments advanced do not seem sound.

Much stress has been placed, for example, on the prospects of large corn and hay crops with fantastic calculations of the large increase in agricultural purchasing power which will result. This contention does not hold water.

The Department of Agriculture estimates, after a careful survey, that 85 per cent of the entire corn crop is used on the farms. A large proportion is taken to feed horses and mules while two-fifths of the crop is fed to hogs and 15 per cent to cattle. Except for what is fed to work animals in cities and towns and the small percentage used for human food, the crop reaches the market in the form of animal products, chiefly hogs, cattle, sheep and dairy products. Prices of live stock are relatively low and are not likely to go much higher.

Corn has never been a "money crop" for the farmer and neither has hay. Only a fraction of the hay crop is consumed off the farms. Here again it goes into animal products.

Agricultural conditions are determined chiefly by the prices of live stock, cotton and wheat. These are the prices which automotive sales executives should watch most carefully, keeping in mind the fact that there are certain favorable factors to offset low prices, such as lower production costs and greater diversification of crops, together with a good demand for dairy products, poultry and fruit. The fact remains, however, that the cotton belt promises to offer the best agricultural market for the sale of automotive products next fall and winter.

All Nations to Meet at Detroit Congress

International Motor Transport
Convention to Be Held in
May of Next Year

NEW YORK, Aug. 28.—Sponsored by the National Automobile Chamber of Commerce, the first international motor transport congress will be held at Detroit in May, 1924.

It will be a non-partisan effort to put the entire world on wheels, to convert everyone to the belief that the automobile is a utility vehicle that cannot be dispensed with in these modern times, or, as the N. A. C. C. expresses it in the announcement just made, "to provide a better understanding of the economic factors underlying motor transportation in every part of the world."

While the definite date has not been settled, it is planned to make it a four-day convention, for which invitations will be extended to foreign government officials, automotive associations, dealers representing automotive manufacturers abroad, and editors of business papers devoted to motor transport in each of the 114 countries where motor vehicles are used.

Foreign Trade Committee in Charge

Initial preparations for the congress are being made by the Foreign Trade Committee of the N. A. C. C., of which J. Walter Drake, now assistant secretary of the Department of Commerce of the United States, was chairman. As yet no successor to him has been named, the committee's personnel at the present time consisting of H. M. Robins, Dodge Brothers; Jay P. Rathbun, White; H. B. Phipps, Hudson; J. D. Mooney, General Motors; Howard S. Welch, Studebaker, and G. F. Bauer, secretary.

This committee is engaged in preparation of the program for the congress, planning subjects of direct bearing on the economic development of international motor transport. These will be handled by prominent executives in automobile companies who also are active on N. A. C. C. committees that study automotive problems pertaining to taxation, highway, insurance, distribution, servicing, operation, financing and other co-operative activities.

Actual automotive conditions in specific countries also will receive attention. Speakers to be chosen from among the delegates will be asked to review the automotive situation in their respective continents and to touch on problems with which they are confronted and in the solution of which the manufacturers and delegates from other countries also are interested.

"The industry believes that this practical exchange of experiences by official

Business in Brief

NEW YORK, Aug. 27.—Outlook for fall business is good at the present time, made so by cooler weather, the passing of summer and activities in the way of meetings and conventions. These factors tend to force matters a bit, developing the immediate need of buying to an extent that promises well for the fall. Domestic purchasing power outside of the few sections which depend upon one crop to fill their pocket-books seems to be fully as good as for the corresponding period last year, if not better.

So far as crops are concerned, corn is reported to be doing well east of the Mississippi as well as in the Ohio valley. In Iowa it is fair to good. Cotton reports are irregular. Texas and Oklahoma have benefited by rains, although continuous downpours have tended to put crops and Louisiana and Mississippi further in the grass. In Georgia things seem worse than ever. South Carolina is promising, and North Carolina is fair to good.

In textiles cotton goods are doing fair to good in large primary markets, which, however, are slightly affected by the possible future of raw cotton. While buying for August and September has been brisk, there seems to be an unwillingness on the part of the mills to sell at current levels for October or December deliveries.

The effect of President Harding's death in the consequent slowing of business is shown in the car loadings for the week ending Aug. 11, when the loadings totaled 973,162, a decrease of 59,968 from the preceding week.

Bank clearings for the week ending Aug. 23 aggregated \$6,021,978,000, a gain of 9.5 per cent over the preceding week and of 2.5 per cent over this week a year ago. New York lost 6.6 per cent over a year ago, but in thirty-eight other cities gains were reported, Los Angeles leading with 49.4 per cent.

and automotive representatives from all countries will tend to create a better understanding of the part contributed by the motor vehicle to the economic development of nations and to help solve urgent transportation problems which are pressing in many countries of the world," Bauer says.

It is expected that the congress will attract approximately 1000 delegates. General Motors has 500 in its export service, most of whom are eligible as delegates, while other big concerns, such as Studebaker and Willys-Overland, can be counted to back the meeting to the limit.

Michelin to Market Cord Balloon Tires

Surprises Industry in Europe by
Announcing Perfection of
New Product

PARIS, Aug. 16. (by mail)—Michelin will place low-pressure balloon tires on the market at the opening of the Paris automobile show in October. The French tire maker's activities in this direction had been kept a profound secret until this week, when he presented to the leading automobile manufacturers a perfected type of "comfort tire," as he has designated it, to be used on small, light cars.

The new tires are clincher bead cord construction, designed to replace the 700 by 80, 710 by 90, and 765 by 90 tires used on such cars as the small Citroen, 7-hp. Renault, the small Mathis, Amilcar, Salmson, Peugeot and other popular models with engines of 67 cu. in. or less.

Instead of the normal section of 80 or 90 mm., the new tires appear to be of 130 mm. section, and instead of the normal 50 to 60 pounds pressure they are inflated only to 18 to 20 pounds pressure.

Makers who have tried out these tires on their cars are enthusiastic regarding them and already have given orders for their show models to be equipped with "comfort tires." Michelin states that he has no intention of confining himself to the present sizes, but has begun at this end of the scale because the necessity for big low-pressure tires is much more pronounced on cars weighing 800 pounds than on those of 2000 pounds.

Not to Make Straight Sides

The price of the new tires has not been announced. It is denied by Michelin that he has any intention of producing straight side tires.

Other European tire makers and representatives of American tire firms appear to have been taken completely by surprise by the Michelin move. They admit that they had no inkling of the preparation of this new tire and its presentation to the manufacturers as a perfected article two months before the show is a very adroit piece of merchandising. It is generally admitted that, introduced for light cars, where its need was really urgent, comfort tires will prove a complete success.

Another Michelin device expected to be shown to the public at the Paris show is a flexible steel band by the use of which it is impossible for a clincher bead tire to leave the rim accidentally after it has been deflated. This device was used with success in the recent races at San Sebastian and as an experiment Andre Boillot drove a heavy Peugeot at

(Continued on page 453)

August Will Exceed Last Month's Output

Improvement in Automobile Sales
Is Reported in Many Sec-
tions of Country

NEW YORK, Aug. 27—Increased activity in automobile manufacturing plants the first two weeks of August indicates that the output for the month will be considerably in excess of that for July. A similar condition prevailed a year ago when, following a let-up in July, August took a pronounced swing upward which made it, next to June, the highest production month of the year. It is not expected, however, that this August will even closely approach the banner month of 1923.

Production totals of this year have followed to a large extent the course that marked the monthly manufacturing activities of a year ago, with the exception that the high point in output was reached a month earlier this year than last. The last five months of 1922, after the slowing down in July, showed a healthy average in the number of motor vehicles produced. The movement upward that came in August, however, was not strong enough to carry production for the remaining months of the year at the same high level and September showed a material drop.

Sales Improve

Improvement in sales is noted in many sections of the country following the announcement of new models and the general retail sales curve is again moving upward. More intensive selling this year than in the past is expected to keep the volume from showing any trend in the opposite direction.

City buying has been exceptionally well sustained, but farming districts have not yet absorbed cars in the volume anticipated. It is still somewhat early to judge of the disposition of the farmer, generally, to buy. In some agricultural states, interest in motor vehicles has been notable, especially during the last few weeks. In Iowa, for example, the resumption of tractor demonstrations is reported, with a number of sales made at the first of a state-wide series.

Motor truck production, which declined slightly during July, is again moving forward and the likelihood is that current schedules will remain in force for the balance of the year. The demand for passenger bus and rail car chassis continues strong. Farm

Standardization Needed in Types of Bus Construction as Well as of Commercial Car Bodies

AN INTERVIEW WITH M. L. PULCHER,
Vice-President and General Manager of the Federal Motor Truck Co.

By D. M. McDonald

Detroit News Representative of the Class Journal Co.

Detroit, August 27.

CUT rate practices and sharp dealing of all sorts are hurting the morale of the truck business, and are keeping out many desirable dealers who under ordinary circumstances would be coming into the business now.

The whole sales end of the business needs a shaking up, M. L. Pulcher, vice-president and general manager of Federal Motor Truck Co., said this week, and many of the undesirable practices weeded out for the general good of the industry. Conditions today are not fair to companies legitimately in the business.

Not alone in allowances on used trucks are unfair practices being indulged in, he declared, but practically the whole sales end of the business is on a cut-throat basis. This sort of condition does not tend toward satisfactory business for anyone, he said, and no company large or small can continue to do business in this way and stay in business.

There is every reason to expect that there will be large business for the truck companies in the fall, just as there has been all year, he said. There has been a summer falling off from the heavy business of the early year but this, he states, was only in keeping with the experiences of other years, and was somewhat smaller than in most years. Most of the buying will continue to be in the lighter models.

Going into the fall season, Mr. Pulcher said, there will be an absence of truck stocks in dealers' hands, new or used, and dealers will be in good shape to go after business in their territories. The country generally is in prosperous condition with a steady expansion in business in all sections, insuring a steady development in the truck market.

The bus business is coming along in good shape, Mr. Pulcher said, but it will not come into its own until it has been definitely determined just what types of buses are best adapted for general transportation requirements. It has been impossible to standardize on bus models because of differences of opinion by operators as to the relative value of certain types of construction. This has had the effect of keeping bus prices high.

The same inability to standardize on different types of commercial car bodies has been costly to truck operators, he said, and to some effect has restrained the growth of the truck business. There is no reason, he asserted, why truck bodies could not be standardized according to the types of work to be performed, with important economies to the operator.

Mr. Pulcher viewed the proposal of the Public Service Railway Corp. in New Jersey to take over bus lines in that State and operate them in conjunction with trolley lines as a very interesting development. In his opinion the corporation would make a complete success of the undertaking, and said he believed bus operation by a controlling company would prove much more satisfactory than under individual owners. Should the company find bus operation successful, he said, it undoubtedly would follow that it would build its own buses, so that from the truck manufacturers' viewpoint, it would not mean increased business.

Many of the railroads of the country are lining up behind the movement to coordinate shipping and transportation, Mr. Pulcher said, and are studying their lines with a view to employing buses and trucks wherever they will result in economies in operation. Opposition for the most part is confining itself to what Mr. Pulcher described as the tank town lines, and many of these, he said, are already finding that a large part of their business is being taken away by private owners of automotive transportation lines.

areas have shown a more wholesome turn in their purchase of trucks but as yet the full power of this market has not been felt.

Parts makers report business at a high point, August proving an unusually good month and the outlook for September being even better. This branch of the industry is experiencing somewhat of a labor shortage, particularly of the skilled character. A greater number of unskilled workers is reported, these being rapidly ab-

sorbed and enabling the parts producing plants to keep output well sustained.

VICTOR'S DEALER CONTRACT

ST. LOUIS, Aug. 27—Guy Wilson, president of the Victor Motors, Inc., has announced a new contract for dealers of his company which will not demand a deposit, nor require a definite schedule of shipment. The company intends to secure estimates of the dealers' requirements without compelling him to make a specific schedule.

Committee Acquires All Winther Assets

Stockholders Come Forward with
Highest Bid—New Company
to Operate Plant

MILWAUKEE, Aug. 27—The stockholders' reorganization committee of Winther Motors, Inc., Kenosha, has finally been declared the successful bidder for the assets in bulk and the sale at \$130,150 has been approved by the referee in bankruptcy. The only other bulk bidder was the E. L. Essley Machinery Co., Chicago and Milwaukee, which offered \$127,500.

The stockholders' committee has been granted three months' time to make complete payment. It will meet Sept. 1 at Milwaukee to arrange payments and to make plans for resuming the operation of the plant as quickly as possible. A new Wisconsin corporation with \$500,000 capital is to be formed at once by the committee.

Earliest Bid Was \$50,000

Not until Thursday, Aug. 23, did it appear likely that the committee would be successful in getting control of the property. The public sale was conducted at the plant on Aug. 16, as scheduled, and the only bulk bid, which was not even entertained, was \$50,000. Parcels were then bid in for a total sum of \$65,000, but did not embrace the real estate, buildings and essential machinery.

These bids were reported by Trustee A. B. McCall to a meeting of creditors held in the office of Referee Milton J. Knoblock in Racine on Aug. 18, and a postponement to Aug. 22 was ordered, there being likelihood of an acceptable bid for the property in bulk being tendered. On Aug. 22 the trustee reported that the stockholders' reorganization committee and the E. L. Essley Machinery Co., Chicago and New York, had put in tie bids of \$127,500.

A second postponement to Aug. 23 was then ordered and the trustee requested to secure new bids which might not be equal. On Thursday the stockholders' committee offered \$130,150 for the property, the Essley company bidding \$128,500, and the stockholders' bid was thereupon accepted, with assurance of confirmation by the Federal Court at Milwaukee.

Dr. Timm Heads Committee

Dr. E. W. Timm, Milwaukee, is chairman of the reorganization committee, and Edward C. Kraemer, Milwaukee, is secretary. The committee has been at work for six months and a short time ago rallied sufficient financial support from stockholders to make possible practically a full payment in cash.

BRITAIN COMPILING FACTS ON INDUSTRY

WASHINGTON, Aug. 27—A new compilation of the British automotive industry is being undertaken by the Society of Motor Manufacturers and Traders of London. According to advices from the American Trade Commissioner it will be the first automotive statistical compilation of this nature available.

The compilation will be known as a "Register of the Motor Trade" of Great Britain. Automobile manufacturers are being requested to give a detailed report of their business. One of the questions asked is for an indication of the approximate American capital employed in the motor industry of the United Kingdom, together with the number of employees engaged in the industry. The register will contain information pertaining to all manufacturers of automotive products.

New Hercules Motor Corp. Takes Over Old Company

CANTON, OHIO, Aug. 27—The Hercules Motor Corp., a new company with capital stock of \$300,000, has taken over the entire plant of the Hercules Motor Co. from E. A. Langenbach, who purchased it recently from the receiver. Langenbach is president and H. H. Timken chairman of the board of the new company.

Charles Balough, who has been head of the plant since its opening in Canton, will continue with the new company as vice-president and treasurer.

Gordon M. Mather, Toledo capitalist, and R. W. Galligher of Cleveland complete the board of directors. H. B. Blake is secretary.

Production at the plant for the first six months of the year averaged more than 1000 engines a month. The plant will operate at full capacity beginning Sept. 1.

Holding Company Gets Property of Pan Motor

ST. PAUL, Aug. 27—Property of the defunct Pan Motor Co., of St. Cloud, Minn., has been taken over by the St. Cloud Holding Co., which has been incorporated for \$50,000. The property was sold recently to creditors' and stockholders' committees at a receiver's sale in St. Cloud for about \$400,000.

Among the incorporators of the new company are C. F. Ladner, Fred Schilpin and C. D. Schwab, who were directors of the old Pan Motor Co. They were defendants in the suit the Government brought against S. C. Pandolfo, president and organizer of the Pan company, for misuse of mails, but were acquitted. Pandolfo was convicted.

Stevens-Duryea Sale Halted by Creditors

Minority Holders of Claims Seek
Information on Company's
Present Assets

SPRINGFIELD, MASS., Aug. 28—A protest on behalf of a minority of the creditors of Stevens-Duryea, Inc., against the sale of the company's plant at Chicopee Falls for \$450,000, when the receivers' petition for authority to make the sale came up in the Superior Court today, led to a continuance of the hearing by Judge Richard W. Irwin until Sept. 15.

Meanwhile the receivers were ordered to file with the court by Sept. 4 a report of their stewardship, so that the minority creditors can examine it and judge for themselves as to whether the amount offered constitutes a fair price.

An attorney for these creditors read a report of the company two months before the concern went into receivership, showing assets of \$6,447,000, and said that his clients could not understand the heavy shrinkage of assets.

Another attorney, representing a creditor whose claim is disputed, said he had a prospective purchaser who would pay more than \$450,000 for the property, and asked that the court postpone action until this person returned from vacation. It was stated that the plant cost \$2,000,000 and that the property is assessed at \$500,000.

Holds 80 Per Cent Claims

Charles H. Beckwith, attorney of Springfield, appearing for the prospective buyers, said that the offer came from a group holding 80 per cent of the creditors' claims, which, nominally amounting to \$825,000, they had acquired for about 25 cents on the dollar.

William H. Brooks, representing the receivers, stated that his clients had no objection to filing a report. He said it was with difficulty that they had obtained the \$450,000 offer and declared it was a bona fide offer, accompanied by a certified check for a \$10,000 deposit. The offer was of July 31, he added, and the offer would expire Aug. 31. When the hearing was continued to Sept. 15, Brooks said he would try to get an extension of time from the group offering to buy the property.

Inland, Body Producer, Is Building Near Flint

DETROIT, Aug. 27—Inland Automobile Co., manufacturer of convertible passenger and truck bodies, has started building a plant near Flint, to which it will remove from Columbus, Ind., about Oct. 10. C. C. Knudson is president.

The company will specialize in a convertible body for use on light chassis in the Ford, Chevrolet, Overland, Gray and Star class, affording a five-passenger or half-ton truck as desired.

Goodrich Acquires Brunswick Business

Manufacture of Latter Tires Has
Been Transferred from
Muskegon to Akron

AKRON, Aug. 25—The business of the Brunswick Tire Corp., which was recently organized as a subsidiary of the Brunswick-Balke-Collender Co. for the purpose of carrying on the parent company's tire manufacturing activities, has been acquired by the B. F. Goodrich Co. It is understood that the Brunswick Tire Corp. eventually will become a Goodrich subsidiary.

Manufacture of Brunswick tires at its Muskegon plant has been discontinued by the Brunswick-Balke-Collender Co. and has been transferred to the Akron plant of the Goodrich company, where Brunswick tires now are being made at the rate of about 2000 a day. The Brunswick plant at Muskegon has been re-equipped for the manufacture of talking machines.

In acquiring the assets of the Brunswick Tire Corp., Goodrich officials announce that Brunswick tires in the future will be serviced exclusively through Goodrich branches. The official personnel of the Brunswick company for the time being will remain substantially the same as when the subsidiary company was formed, with B. E. Bensinger, president of the Brunswick-Balke-Collender Co., as president; H. T. Davenport as vice-president and T. A. Dwyer as secretary.

R. McTammany, manager of the Akron branch for the B. F. Goodrich Co., becomes sales manager for Brunswick tires, with E. H. Brandt, assistant sales manager of the Brunswick Tire Corp., as his assistant.

Goodrich officials say Brunswick tires have been reaching fields untouched by competitors and that the Brunswick line will be continued for these specific trade channels.

Cleveland S. A. E. Members See Firestone Tire Film

AKRON, OHIO, Aug. 25—Members of the Cleveland section of the Society of Automotive Engineers held their regular meeting in Akron this week as guests of the Firestone Tire & Rubber Co., James E. Hale of the development department of the Firestone company acting as host.

The S. A. E. members drove to Akron in automobiles and opened the day's program with a luncheon at the Firestone clubhouse, later making a tour of inspection of recently completed plants of the Firestone Steel Products Co., and thence going to the Firestone tire factories.

The business session was held in the Firestone auditorium, the features of the meeting being the showing of films

TRACTOR HIRED OUT NOT LIABLE FOR TAX

MILWAUKEE, Aug. 27—The opinion recently handed down by the Attorney General of Wisconsin that a tractor used for hauling threshing and silo filling outfits on the public highways, from farm to farm, for hire, is subject to the new weight tax imposed on all motor vehicles, trailers, tractors, etc., has been withdrawn, and this class of machine placed in the exempt list of tractors used exclusively for agricultural purposes. The former opinion held that such use was commercial rather than agricultural.

The new opinion says that closer inspection of the law leads to the belief that the Legislature intended to be reasonable in imposing the new weight tax. The annual license fee for a tractor used for hauling threshers, etc., would be about \$200 and it is held that the profits to the owner are not sufficient to permit such a payment to be made.

of the Firestone air cushion tire and the discussion relative to this new casing.

Following the business session the guests, about seventy-five in number, were driven to the Portage country club where they were entertained at dinner.

Government Puts July Production at 327,102

WASHINGTON, Aug. 28—Revised figures of the United States Department of Commerce show that automobile production in the United States during the month of July was 327,102 passenger cars and trucks, or 80,495 more than the July production last year.

The figures, month by month, with comparisons for last year are as follows:

	Passenger Cars		Trucks	
	1923	1922	1923	1922
January	223,706	81,693	19,398	9,416
February ...	254,650	109,171	21,817	13,195
March	319,638	152,959	34,681	19,761
April	344,474	197,216	37,527	22,342
May	350,180	232,431	43,013	23,788
June	337,143	263,027	40,616	25,984
July	297,104	224,770	29,998	21,837

Miller Announces New Cord With Flat Tread

AKRON, Aug. 28—The Miller Rubber Co. has announced a new 30 x 3½ cord tire with flat tread to sell at practically fabric tire prices. Miller engineers say the flat tread construction will give a 20 per cent greater service than the round tread tire and will afford additional cushioning and easier riding.

The new tire is also featured by a special side wall construction of tread stock running from head to bead.

Collins Entrenched in Strong Position

More Vigorous Campaign of Manufacturing and Selling Will
Come as a Result

CLEVELAND, Aug. 29—Fortified by a vote of confidence by his stockholders and further bolstered by the importunings of his directors to remain and continue the work of directing as president the affairs of the Peerless Motor Co. in this city, Richard H. Collins states that the entire group of associates that he brought with him from Detroit and took over from the group of old Peerless employees would remain with him to carry out expansion plans that have been laid out.

With Collins thoroughly acclimated to his new position and with Peerless affairs at his finger tips, Cleveland men interested in the plant are expecting a far more vigorous campaign in the near future than has ever before marked the company's production and sales efforts.

Collins stated that he will market the Collins six, in addition to the Peerless eight-cylinder car. He declined at this time to give definite information as to when the new "six" will be ready to market or at what price it will be built. That it will be a medium priced car is fairly well assured.

Cleveland bankers and business men interviewed are pleased at Collins' decision to remain. He and his associates have the ability to progress much further with the company than has been possible since they assumed control twenty-two months ago, during which time its progress has been one of the outstanding features of the automobile world, said the president of one of the largest local banks.

Fitch Succeeds Booth With Republic Rubber

YOUNGSTOWN, OHIO, Aug. 27—E. H. Fitch, receiver for the Republic Rubber Co., before it was taken over by the Lee interests, has been chosen president of the Republic company, succeeding C. H. Booth, whose policies he will continue.

Fitch's service in the industry includes fourteen years as district manager of the Philadelphia division of the Diamond Rubber Co., following which he was at the head of the combined Goodrich-Diamond interests in Philadelphia.

S. A. E. MEETING JAN. 22-25

NEW YORK, Aug. 27—Announcement is made by the Society of Automotive Engineers that dates have been selected for the next annual meeting, which is scheduled for Detroit instead of New York City. The meeting will be held Jan. 22-25 in the General Motors Building, at the time of the Detroit show.

Mohawk-Star Rubber Companies to Merge

Both Lines of Tires to Be Continued—Consolidation Waits on Stockholders

AKRON, Aug. 28—Merger of the Mohawk Rubber Co. and the Star Rubber Co., both of Akron, virtually has been agreed upon by directors and officers of both companies, and now awaits only the ratification of stockholders.

Stockholders' meetings have been called for Sept. 29 to ratify the proposed merger, and notices with blanks for votes by proxy have been sent to all shareholders.

Under the proposed merger the Mohawk company practically will absorb the Star company, paying Star stockholders 8,190.72 shares of Mohawk preferred stock and 17,321.65 shares of Mohawk no par common stock, and assuming all obligations of the Star company.

It is proposed to increase, by vote of the stockholders, the capitalization of the Mohawk company from 47,500 shares, consisting of 25,000 shares of no par common stock and 22,500 shares of preferred stock with a par value of 100 each, to 70,000 shares, consisting of 40,000 shares of no par common stock and 30,000 shares of preferred stock.

The two companies are doing a combined business of about \$5,000,000 a year. Both the Star and Mohawk lines of tires will be continued under the merger, and for the time being both plants will be operated.

Officers of the Star company are: L. H. Firey, president and treasurer; R. L. Robinson and W. A. Humphreys, vice-presidents; Francis Seiberling, secretary, and J. W. Dessecker, assistant secretary and treasurer.

Mohawk officers include R. M. Fillmore, president; S. S. Miller, vice-president and factory manager, and P. H. Goodall, secretary.

Earl Motors Will Continue Making Cars for Some Time

DETROIT, Aug. 27—Earl Motors Manufacturing Co. will continue to manufacture cars for some time, according to President George C. Scobie, re-elected to that position at a directors' meeting last week. What the future manufacturing policy of the company will be has not been determined, but for the present the company is making cars and also parts and supplies for other car and parts companies.

Earl cars are being advertised for sale at retail here at \$300 under the list price, but this, Scobie says, is only a local proposition and he states that no reduction from list prices has been made at the factory, nor is there a general reduction in prices by dealers. The company is building ten to fifteen cars daily under present schedule, he says, and is aiming at a twenty-five daily schedule.

Officers elected at the directors' meeting, in addition to Scobie, were Kennedy L. Potter, vice-president, and R. A. Winke, secretary and treasurer. W. E. Stalanker, who has been sales manager under the former reorganization, has resigned, and Scobie has taken over the sales manager duties himself, for the time being. There were no developments in the plan whereby the bank holdings in Earl were to be taken over by a Chicago syndicate, Scobie declares.

Jackson Motor Shaft Co. Bought by Its Officers

DETROIT, Aug. 28—The Jackson Motor Shaft Co., a unit of Earl Motors Corp., has been purchased by its officers and will be operated under the new control beginning Sept. 1. Transfer of the stock has not yet been completed, but all details incidental to the sale are expected to be closed by the end of August. The purchase price is not announced but is understood to approximate \$500,000.

The new officers of the company are O. H. Schultz, president and general manager; C. H. Franklin, vice-president; Charles Hueman, secretary, and Frank Stienke, factory superintendent. Policies of the company will not be changed.

The company manufactures crankshafts and camshafts and has a yearly output of about 150,000 of the former and 200,000 of the latter.

Maxwell and Chalmers Models Cut in Price

DETROIT, Aug. 29—Effective today, the prices on Maxwell cars have been reduced from \$65 to \$90 on the open models, and from \$40 to \$50 on the closed. On the Chalmers all models have been lowered in price \$50 with the exception of the sedan, which has been reduced \$100. The new list is as follows:

MAXWELL		
	Old Price	New Price
3-pass. roadster.....	\$885	\$795
Sport roadster.....	975	895
5-pass. phaeton.....	885	795
Special sport phaeton...	1,045	975
Red sport phaeton.....	1,025	960
Club coupe.....	985	935
Standard coupe.....	1,235	1,195
Standard sedan.....	1,335	1,295
Travelers sedan.....	1,635	1,585

CHALMERS		
	Old Price	New Price
5-pass. phaeton.....	\$1,235	\$1,185
Sport phaeton.....	1,385	1,335
7-pass. phaeton.....	1,345	1,295
4-pass. coach.....	1,585	1,535
7-pass. sedan.....	2,195	2,095
3-pass. roadster.....	Discontinued.	

Maxwell Truck Unchanged

DETROIT, Aug. 27—Prices on Maxwell's 1½-ton truck have not been increased, as reported during the past week. The list price on the model equipped with solid tires all around remains at \$932. Four other tire combinations are offered at prices that range to \$1,097 with 35 x 5 cords all around. Other prices, according to tire equipment, are at \$952, \$972 and \$1,034.

Electric Auto-Lite Earned \$7.25 Share

In Half Year \$600,000 Outstanding Bonds Retired—Retirement of More Planned

TOLEDO, OHIO, Aug. 27—Net earnings of the Electric Auto-Lite Co. for the first half of the year were announced here as \$1,813,095, equivalent to \$7.25 per share on 250,000 shares of no par common outstanding.

During that period more than \$600,000 of outstanding bonds were retired. President C. O. Miniger states that he expects to purchase and retire about \$400,000 more before Dec. 1. This would leave only \$1,000,000 outstanding at that time. During the first half year 350,000 starting and lighting systems were built, as compared with 411,000 for the entire year of 1922. The last half of this year has 250,000 jobs scheduled.

"I firmly believe that we will be called upon to build a minimum of 750,000 jobs in 1924," Miniger declares. "And after careful survey of our plant and necessary investment in additional equipment to take care of the increased production and equipment, I am positive we will need no more buildings and the necessary investment in additional equipment will not exceed \$50,000. I am sure that we can purchase an additional \$400,000 of bonds by Dec. 1, and have left \$1,000,000 in working capital. I can conceive no brighter picture."

The branch plant at Adrian, Mich., is increasing its force and will soon have about 250 employees at work.

St. Louis Automotive Co. Receivership Is Sought

ST. LOUIS, Aug. 28—A suit for receivership has been filed against the St. Louis Automotive Co. by Mrs. Catherine Gerdes, Alton, Ill., in behalf of her son, John I. Gerdes.

The petitioner alleges that she invested \$13,459 of a trust fund which she, as her son's guardian, had in her care, in the company upon representations of President John Neskov.

Further allegations are made that officers of the company permitted machinery of the company to be sold to satisfy a \$2,000 judgment against Neskov.

It is stated that the business is insolvent and the plant dismantled.

CHANGES IN ITALIAN TARIFF

WASHINGTON, Aug. 29—There is no change in the import duties on automobile wheels under the new tariff rates in Italy, effective July 26, but automobile wheels (not specified heretofore) must bear a duty of 32.40 liras per 100 kilos on rims and 39.60 liras per kilo on finished wheels. The duty on motorcycles was reduced from 240 liras each to 216 liras.

Coordination Report Soon Will Be Issued

Committee Gets Preliminary Draft
from A. H. Swayne at Meeting in New York

NEW YORK, Aug. 30—Chairman A. H. Swayne of the Committee on the Relation of Highways and Motor Transport to Other Transportation Agencies, organized by the Chamber of Commerce of the United States, presided at a meeting of the committee at the headquarters of the Merchants Association of New York yesterday, at which the preliminary draft of its report was considered. The complete report, which will embody many recommendations, will be issued shortly.

This report will tell of the committee's investigations as to the merits of the motor vehicle as an aid rather than as a competitor of rail and water carriers.

The investigation has taken up a variety of questions, such as the relieving of congestion of rail terminals by the more systematic use of trucks, the improvement of traffic congestions in city streets, the possibilities of store-door deliveries of freight, the turning over of short freight hauls to motor trucks, the use of passenger buses to supplement electric lines and the regulation of motor truck lines.

Philippine Rubber Party Will Be Headed by Vance

WASHINGTON, Aug. 28—C. F. Vance of Troy, Ohio, has been placed in charge of the field expedition that is to investigate rubber possibilities in the Philippines in behalf of the Department of Commerce. Vance has had fifteen years' experience in the Philippines and is thoroughly conversant with the small rubber plantation situation of the Islands.

He will be assisted by Alex H. Muzzall of Carpinteria, Cal., a practical rubber plantation man who for many years was connected with the Goodyear plantations in Sumatra; by John P. Bushnell of Washington, assistant trade commissioner of the Department of Commerce, who has been identified with rubber investigation activities of the Department since its inception, and by Mark Baldwin of the Bureau of Soils.

The party is expected to sail from Seattle on Sept. 11.

New Oldsmobile Model Exhibited in Toronto

DETROIT, Aug. 28—The public appearance of a new Oldsmobile Six at the Toronto show was premature, according to A. B. C. Hardy, president of the Olds Motor Works, as the models will not be announced in the United States until Oct. 1, nor prices set until late September.

The Canadian showing was intended to give Canadian dealers who do not get into distributing headquarters more than once a year an opportunity of visioning what the new six-cylinder would be like. There has been no production on the new line either in the United States or in Canada, and there will not be any until well into September.

The Lansing plants are being equipped for manufacturing the new model, but it will take considerably more time to get things ready. The only cars of the new line thus far are experimental models of which the Canadian exhibit is one. When produced the car will be practically identical with the one exhibited.

Sales Outlook in Canada Reported as Being Good

DETROIT, Aug. 27—Favorable crop conditions in Canada, combined with capacity operation in the wood pulp industry and increased business in the iron and steel trades, due to demand from railroad sources, indicate the continuance and a probable increase in automotive demand, according to E. J. Weil of the Cadillac Motor Car Co. of Canada.

Lower prices of Cadillac cars in this market, due to the locating of the Canadian plant, has helped increase Cadillac business to a large extent, he says.

Wills Finds Prospects Good

DETROIT, Aug. 27—Fall business prospects are very good, says C. H. Wills, president of Wills Sainte Claire, Inc., and the company is rounding out its distributor and dealer organization to take full advantage of it.

Since the formation of the new company, Wills states, executives have been outlining plans for fall and spring business, and these are now becoming effective. Due to seasonal conditions and to circumstances incident to the changes in the company, schedules have been reduced up to now, but are now being expanded.

Haynes Phaeton for 1924 Has Permanent Type Top

KOKOMO, IND., Aug. 27—A new Haynes 1924 Model 60 phaeton has been announced, listed at \$1,295. The body has been redesigned and there is a new system of checking the rebound. The top is now of the permanent type.

A number of refinements have been made throughout the chassis, including a larger crankshaft, pressure feed lubrication to the main bearings, a shortening of the stroke from 5 to 4 1/4 in., a new oil measuring rod on the crankcase, new type shortened spark and throttle controls on the steering column.

TO RACE FOR BALLOON CUP

ST. LOUIS, Aug. 28—Capt. H. E. Honeywell, St. Louis balloonist, has been guaranteed \$1,000 expense money by the St. Louis Real Estate Exchange in order to make a trip to Brussels, Belgium, to race for the Gordon-Bennett cup.

Used Trucks Yield Profits from Parts

Manufacturers Favor Dismantling
of Vehicles Where Conditions Justify It

DETROIT, Aug. 27—Removal of many used trucks from the market by dismantling them and selling such of their parts as are capable of continued service as used parts, is receiving the indorsement of truck makers. A number of dealers in many lines of trucks are reported to be disposing of some vehicles in this way, with the frank approval of the manufacturers, so long as the parts so salvaged are capable of more service and are sold as used parts.

Manufacturers report many instances of dealers who have been doing this for over a year or more at a profit. The difficulty with the system comes in confining this method of disposal only to those trucks which cannot be resold more economically and in the possibility of piling up a stock of parts by the dismantling of more trucks than the parts business of the dealer warrants.

That the plan can be employed to a certain extent successfully is recognized by manufacturers, and a number are passing the word on to their dealers to consider used truck allowances with this thought in view.

One manufacturer discussing the dismantling process says the average dealer is in position to do it with his ordinary service department equipment. By dismantling only trucks that are practically ready to be junked anyhow, and on which only junk allowances have been made, it does not mean that much money is to be tied up in parts. By dismantling, the dealer too is enabled to make somewhat better allowances than in cases where a truck is to be scrapped by the ordinary process and with profit to himself.

Many large users of trucks would be scrapping trucks for their parts, this manufacturer states, if it were not that it is possible for them, in the present stage of the truck business, to get more money than the vehicles are worth by trading them in on new ones.

\$201,000 Bid for Assets of Ideal Tire & Rubber Co.

CLEVELAND, Aug. 29—Three bids for the assets of the Ideal Tire & Rubber Co. were received this morning in response to the advertisement of the receivers, Newton D. Baker and E. S. Griffiths, for bids on the plant and property.

One bid submitted by O. L. Brown, who represents a group of stockholders, totaled \$201,000 for the entire property. The National Mortgage Co., now the Union Mortgage Co., bid \$197,000, while H. Muehlstein & Co. of Akron bid \$22,780 for the personal property alone.

The bids probably will be acted upon some time after Labor Day.

Men of the Industry and What They Are Doing

Will Attend Foreign Shows

Engineers of General Motors units will attend both the Paris and London shows, reservations having been made on the *Majestic*, which sails Sept. 22. Included in the party are H. H. Bassett, general manager, and F. A. Bower, assistant chief engineer, of the Buick division; B. Jerome, chief engineer of Oakland; W. R. Strickland, assistant chief engineer of Cadillac; R. T. Jack, chief engineer of Oldsmobile; H. W. Moyse, chief engineer of General Motors of Canada, and Lawrence Fisher and Alfred J. Fisher of the Fisher Body Corp. On the other side the party will be looked after by W. O. Kennington, chief engineer of General Motors of London, who has made arrangements for visits to leading English and Continental factories in addition to taking in the automobile shows.

Rutherford Surveys Coast Conditions

W. O. Rutherford, vice-president in charge of sales of the B. F. Goodrich Co. and president of the Rubber Association of America, is making an extensive survey of trade conditions on the Pacific Coast.

H. H. Doering Resigns

H. H. Doering has resigned as sales manager of Rauch & Lang, Inc., Chicopee Falls, Mass., after serving in that capacity since the formation of the company. He was also vice-president and member of the board of directors. Prior to his connection with Rauch & Lang, Doering was sales manager for three years for the Baker R. & L. Co. of Cleveland, when it manufactured the Rauch & Lang automobile. Doering will take a rest for the balance of the summer, with the expectation of engaging in activities along other lines in the automobile industry this fall. He is at present in Milan, Ohio.

Hudson Advances Federspiel

H. P. Federspiel, special sales representative for the Hudson Motor Car Co., has been promoted to assistant sales manager. Federspiel has been with the Hudson organization for about a year and is well known to the distributor force.

Rubber Review Founder Retires

Theodore Eugene Smith, president of the Akron Standard Savings Bank and the founder and former publisher of *India Rubber Review* of Akron, has retired and removed his residence to his farm at West Camp on the Hudson, New York. Smith was identified with the publishing of *India Rubber Review* for twenty years and was active in philanthropic work in Akron, serving as president of the Better Akron Federation, Associated Charities, Travelers Aid, Union Mission and Red Cross. He was

twice president of the Akron Rotary Club and the first governor of the new Northeastern Ohio Rotary district international.

Evans on Trip to Pacific Coast

E. S. Evans of E. S. Evans & Co., Detroit, is on a trip to the Pacific Coast, where he will visit the branch automobile plants in that territory with a view to determining their shipping requirements in the next year. From there he will go to Alabama, where he is negotiating a lumber contract, which will give him an additional supply for requirements in 1924. He anticipates next year will see a continuance of heavy automobile shipping.

Young to Inspect Zeppelin

W. C. Young, aeronautical sales manager for the Goodyear Tire & Rubber Co., has sailed for Europe to make a study of foreign aeronautical developments. He will inspect the finishing work on the ZR-3, the giant Zeppelin being built for the United States in Germany, and has been invited to return to America as a passenger when it negotiates its flight across the ocean to this country.

Ross C. Dick Joins Climax

Ross C. Dick, connected with R & V interests for seventeen years and recently production engineer for the Yellow Sleeve Valve Engine Works, Inc., has resigned to become production engineer for the Climax Engineering Co. of Clinton, Iowa.

Falor With Columbus Tire

Shelby Falor, former president of the Falor Rubber Co. of Akron, has become sales manager for the Columbus Tire & Rubber Co. at Columbus, Ohio. His company, which manufactured inner tubes exclusively discontinued business several weeks ago. Falor for twenty years was a member of the board of control of the Goodyear Tire & Rubber Co.

Dugan and Mason in Partnership

F. F. Dugan and C. L. Mason, former officials of the Denman-Myers Cord Tire Co. of Warren, Ohio, have severed connections with that company and have established the partnership of Dugan & Mason. They have opened offices in Akron and will handle rubber factory supplies of all nature. Dugan formerly was vice-president of the Denman-Myers Company, and Mason was sales manager.

Pye in Business for Himself

Robert E. Pye has resigned as sales manager of Stevens & Co. of this city, manufacturer of automotive equipment, to enter business for himself. No successor has yet been announced.

G. M. Traffic Heads Form Organization

New Group Will Develop Policies of Corporation Toward Railroad Questions

DETROIT, Aug. 27—Organization of traffic managers and directors of traffic of General Motors divisions, subsidiaries and affiliated companies was completed here at a meeting presided over by A. H. Swayne, vice-president of the corporation.

The object of the new group is to coordinate the various traffic problems confronting the many divisions of General Motors and to develop the policies of the corporation toward railroad questions in general. The committee will hold bi-monthly meetings at which there will be general discussions of traffic problems and the utilization of the individual experiences of the members of the association in working out solutions of these problems.

Swayne will serve as chairman, with C. A. Sullivan of Fisher Body as secretary. A sub-committee consisting of George C. Conn, chairman; C. A. Sullivan, W. C. LeFebvre, C. R. Scharff and Earle W. Webb will act as a clearing house for the whole committee.

Many Present at Meeting

Those present at the meeting were:

Chairman, A. H. Swayne, vice-president, General Motors, New York; A. J. Shandorf, Brown-Lipe-Chapin Co., Syracuse, N. Y.; George C. Conn, Buick Motor Co., Flint, Mich.; George Teeterman and George A. Main, Cadillac Motor Car Co., Detroit; C. R. Scharff and C. F. Mowbray, Chevrolet Motor Co., Detroit; C. A. Schneider, Dayton Engineering Laboratories Co., Dayton, Ohio.

C. C. Callison, Delco-Light Co., Dayton, Ohio; C. A. Sullivan, Fisher Body Corp., Detroit; S. J. Ryan, Fisher Body Ohio Co., Cleveland, Ohio; A. Morse, General Motors Export Co., New York; Earle W. Webb and W. C. LeFebvre, General Motors Corp., Detroit; A. W. Bell, General Motors of Canada, Ltd., Oshawa, Ont.; E. D. Carroll, General Motors Truck Co., Pontiac, Mich.

W. K. Herwig, Harrison Radiator Corp., Lockport, N. Y.; L. C. Brandenburg and D. A. McCarthy, Hyatt Roller Bearing Co., Newark, N. J.; John E. Manley, Jaxon Steel Products Co., Jackson, Mich.; A. L. Shaw, Klaxon Co., Newark, N. J.; J. A. Peters, Lancaster Steel Products Co., Lancaster, Pa.; J. A. Brady, Muncie Products Co., Muncie, Ind.

H. C. Sanders, Northway Motor Manufacturing Co., Detroit; J. C. Haines, Oakland Motor Car Co., Pontiac, Mich.; D. C. Whitmore, Olds Motor Works, Lansing, Mich.; E. M. French, Remy Electric Co., Anderson, Ind.; L. H. Bayliss, Saginaw Products Co., Saginaw, Mich. and R. C. Campbell, United Motor Service, Inc., Detroit.

Parts Commitments Reach into October

July Showed Decline from June
in Volume of Sales but In-
crease Over Last Year

NEW YORK, Aug. 27—Reports received from members of the Motor and Accessory Manufacturers' Association tend to bear out the predictions that business this fall with automobile producers and parts makers will continue excellent.

From the listening posts comes evidence that there has been no dreaded slump. True, there has been a slight seasonal decline, if it may be called such, but ahead of the industry, in the fall months anyway, there is every reason to believe that the automobile business will pursue the even tenor of its way.

Parts people report commitments extending well into October in many cases and there seems to be no such word as cancellation in automobile language. The motor car manufacturers seem eager to get in materials and to be so well entrenched financially that collections are reported extra good.

This optimistic slant on the outlook for the immediate future accompanies the report on July business transacted by members of the M. A. M. A. July showed a slight falling off in sales from June—16.4 per cent to be exact—but that is not at all alarming, for the total of \$48,536,700 is considerably in advance of the \$41,000,000 total of July, 1922, and is about on a par with February of this year.

Collections continue good. July's past due accounts total \$2,313,400 as compared with June's \$2,191,150, an increase of 5.6 per cent, while July notes outstanding amount to \$1,424,450 as compared with June's \$1,111,970, an increase of 28.1 per cent.

Denmark to Build Roads Similar to Those Here

PHILADELPHIA, Aug. 27—Denmark is preparing to build a system of concrete highways modeled after those in the United States, according to Edouard Svenson, civil engineer and professor at the Royal Technical College, Copenhagen, and Soren T. Ellert, highway engineer of Holback, who are stopping at a local hotel.

Denmark, they say, has 5000 miles of highway, none of it concrete. The surface is macadamized in some instances, or paved with small pebbles which are durable, but none too smooth. Denmark's demand for smoother roads, concrete especially, is caused by the greatly increasing use of automobiles and trucks.

TIRE FABRIC PLANT CLOSED

MILLEN, GA., Aug. 27—The Millen plant of the Western Reserve Cotton

BUSINESS OF M. A. M. A. MEMBERS DURING JULY REACHED TOTAL OF \$48,537,700

NEW YORK, Aug. 27—Reports from members of the Motor and Accessory Manufacturers Association show that sales in July decreased 16.4 per cent over the preceding month. Total purchases amounted to \$48,537,700, in comparison with \$53,067,500 in June.

The following table shows the sales by members of the association, the total past due accounts and the totals of notes held for all of 1922 and the first seven months of 1923:

	Total Sales	Per Cent Change	Total Past Due	Per Cent Change	Total Notes Outstanding	Per Cent Change
1922						
January	\$17,320,000	20.61 Inc.	\$4,450,000	5.45 Inc.	\$3,146,000	7.02 Dec.
February	22,720,000	31.17 Inc.	4,070,000	8.57 Dec.	3,483,000	10.74 Inc.
March	28,670,000	26.14 Inc.	2,890,000	28.86 Dec.	2,657,000	23.69 Dec.
April	33,830,000	18.70 Inc.	3,000,000	2.00 Inc.	2,500,000	1.05 Dec.
May	43,700,000	28.06 Inc.	2,900,000	2.75 Dec.	2,450,000	6.05 Dec.
June	42,000,000	3.85 Dec.	2,840,000	1.25 Dec.	2,320,000	5.00 Dec.
July	41,001,670	2.42 Dec.	3,423,850	20.42 Inc.	2,217,670	4.49 Dec.
August	45,700,000	5.00 Inc.	3,705,000	8.21 Inc.	2,398,350	8.15 Inc.
September	37,300,050	13.36 Dec.	4,220,400	13.91 Inc.	2,658,800	10.86 Inc.
October	39,753,800	3.90 Inc.	3,463,850	17.93 Dec.	2,603,100	2.09 Dec.
November	36,616,850	5.51 Dec.	4,245,850	22.58 Inc.	2,442,700	6.15 Dec.
December	34,711,630	5.20 Dec.	3,494,850	17.69 Dec.	1,905,650	21.98 Dec.
1923						
January	45,451,950	30.94 Inc.	2,469,950	29.33 Dec.	1,945,850	2.11 Inc.
February	48,518,700	6.75 Inc.	2,741,100	10.82 Inc.	1,981,950	1.86 Inc.
March	59,428,800	22.49 Inc.	2,129,350	22.32 Dec.	1,929,300	2.66 Dec.
April	61,647,050	4.00 Inc.	2,313,150	8.05 Inc.	1,839,350	5.00 Dec.
May	58,409,550	5.25 Dec.	1,982,750	14.28 Dec.	1,140,150	38.00 Dec.
June	58,067,500	.059 Dec.	2,191,150	10.55 Inc.	1,111,970	2.47 Inc.
July	48,536,700	16.4 Dec.	2,313,400	5.6 Inc.	1,424,450	28.1 Inc.

Mills Co. of Georgia, manufacturer of tire fabric, has been closed down for an indefinite period, officials of the company have announced. It had been previously stated by officials that the plant, which has been shut down for the past few weeks, would resume about Sept. 1.

Hinged Glass Pane Allows Operator to Make Signal

DUBUQUE, IOWA, Aug. 25—W. A. Erner of this city has invented and applied for a patent on a door window for closed cars, having a lower horizontally hinged section through which the operator can extend his arm for the purpose of signaling to drivers in the rear.

The hinged lower section can be closed by pulling on a weighted pull cord or by means of a lever. It can be opened instantly by merely pushing against the glass, and can also be opened by either a fixed or a detachable lever.

Malay States Will Use Only One Kind of Truck

WASHINGTON, Aug. 27—The ire of automobile manufacturers in Great Britain, and especially exporters of automotive equipment to the British Malaya states, has been aroused over the action of the government of those states in standardizing on one kind of automobile truck to the exclusion of any other.

In the past there has been a number of American trucks bought each year by the government, says a report made to the automotive division of the United States Department of Commerce. In the future, however, but one kind of a British truck is to be purchased.

September Promises Active Parts Month

MILWAUKEE, Aug. 27—The situation of the automotive parts and equipment industry in Milwaukee and vicinity as August comes to a close is one of the most gratifying spots in the entire industrial structure, while the outlook for September is even better.

The demand for skilled and common labor in these trades is reported unabated, while the supply continues below needs, although it is noted that unskilled workmen are gradually becoming more plentiful, but with good absorption.

Only in one month—February—since the first of the year has there been a reduction in pay-roll numbers of the automotive parts and equipment group, according to the current summary of conditions by the largest Milwaukee bank. Business of this group was well maintained during July, and preliminary reports on August are similar. It says that "prospects for the foundries and machine shops dependent upon the automotive industries are reported to be exceptionally good."

Tire and motor truck production schedules, which took a slight dip in July, have made some gains in August and expect to sustain current schedules for the remaining months of the year.

Retail trade in Milwaukee during August has been of a more active character than was expected. As in July, sales showed a healthy increase when compared with the corresponding month last year. The appearance of new models has been the signal for marked increase in buying interest.

Mid-Summer Brought No Slump in Exports

Trucks Moved Up Sharply in July—Passenger Car Ship- ments Showed Slight Drop

WASHINGTON, Aug. 28—Mid-summer brought with it no slump in the exports of motor vehicles from the United States, judging from the statistics of overseas shipments during July, just made public by the Automotive Division of the Bureau of Foreign and Domestic Commerce.

Truck exports were up sharply from the previous months to the highest level of the year. Passenger car shipments, as also was the case with parts and accessories, showed a slight decline from the totals reached in both May and June, this probably being due to the approach of

new models and likewise to the seasonal changes in foreign countries making up the chief markets.

The July statement, details of which are given in the accompanying table, place the passenger car totals at 11,817, valued at \$7,781,554, as compared with 12,387 valued at \$8,971,827 during June. The smaller volume was chiefly shown in the higher priced classes, particularly in the price classification of from \$500 to \$800. A considerable increase over June shipments was recorded in the lowest price group, valued up to \$500.

The truck exports were recorded as 3105, valued at \$1,578,500, the highest yet reached in the present upward swing of overseas trade. The chief gain, as was expected, was shown in the group comprising the one-ton and smaller sizes. The parts and accessories total was \$4,488,429.

Ford's July Sales Abroad

DETROIT, Aug. 29—Total sales of Ford cars and trucks at assembly sta-

tions and sales branches abroad during July were 13,282.

Totals at assembly branches were as follows: Manchester, 2734; Copenhagen, 2720; (this figure including 430 credited to the Cork, Ireland, plant); Buenos Aires, 1127; Bordeaux, 1051; Sao Paulo, 714; Barcelona, 610.

The total assembled abroad approximates 9000, leaving about 5000 shipped complete from the United States, these latter being included in the Department of Commerce figures announced from Washington.

Canada Exported 4341 Automobiles

OTTAWA, ONT., Aug. 28—Exports of automobiles from Canada during the month of July totaled 4341, with a value of \$1,985,160. This is shown in a report of the Dominion Bureau of Statistics. During the twelve months ending with July, the exports of passenger cars were 51,991, as compared with 22,330 during the preceding period, showing vast improvement in the export field.

Exports and Imports of the Automotive Industry for July of Current Year and Totals Reported for the Seven Months Ending July 31

	Month of July				Seven Months Ending July 31			
	No.	Value	No.	Value	No.	Value	No.	Value
EXPORTS								
Automobiles, including chassis.....	6,451	\$5,165,643	14,957	\$9,405,885	42,350	\$33,049,011	91,589	\$61,359,428
Electric trucks and passenger cars.....	29	35,954	35	45,831	185	269,329	148	203,613
Motor trucks and buses, except electric:								
Up to 1 ton.....	553	199,871	2,655	922,187	3,871	1,563,034	11,827	4,081,322
Over 1 and up to 2½ tons.....	186	288,190	353	434,528	1,207	1,690,289	2,336	2,834,929
Over 2½ tons.....	83	246,087	97	221,785	445	1,152,419	520	1,196,922
Total motor trucks and buses, except electric.....	822	734,148	3,105	1,578,500	5,523	4,405,742	14,683	8,113,172
PASSENGER CARS								
Passenger cars, except electric:								
Value up to \$500, inclusive.....			6,510	2,392,359			34,559	12,213,732
Value over \$500 up to \$800, inclusive.....	3,568	1,778,995	1,693	1,137,443	23,203	11,155,104	16,461	11,016,048
Value over \$800 and up to \$2,000.....	1,837	2,070,316	3,368	3,566,078	12,254	13,612,768	24,075	25,247,744
Value over \$2,000.....	195	546,230	246	685,674	1,185	3,606,068	1,663	4,565,119
Total passenger cars, except electric.....	5,600	4,395,541	11,817	7,781,554	36,642	28,373,940	76,758	53,042,643
PARTS, ETC.								
Parts, except engines and tires*.....	11,791,538	2,825,335			92,999,168	22,504,555		
Automobile unit assemblies*.....			3,397,171	534,415			21,375,812	3,341,090
Accessories, parts of*.....			18,194,791	4,488,429			136,602,605	31,256,874
Automobile service appliances (not elsewhere specified)*.....			179,614	88,079			805,349	431,061
Station and warehouse motor trucks.....	9	11,887	10	8,745	104	108,106	108	52,628
Trailers.....	27	15,300	95	24,455	293	134,738	787	283,287
Airplanes and seaplanes.....	7	28,300	9	32,521	32	58,130	36	261,251
Other aircraft.....			1	500			1	500
Parts of airplanes, except engines and tires*.....	7,933	6,005	5,174	3,036	129,038	55,966	93,099	23,277
BICYCLES, ETC.								
Bicycles and tricycles.....	790	11,256	1,736	17,350	5,555	77,031	16,219	121,834
Motor cycles.....	965	267,220	1,524	381,541	9,433	2,505,373	13,624	3,195,564
Parts, except tires*.....	176,448	100,729	371,095	177,167	1,881,471	1,015,319	2,068,691	1,036,977
INTERNAL COMBUSTION ENGINES								
Stationary and Portable Engines:								
Diesel and semi-Diesel.....	12	18,756	39	7,427	67	66,165	765	318,700
Other stationary and portable.....	1,905	237,007			13,910	1,773,263		
Not over 8 hp.....			2,496	202,064			17,422	1,664,404
Over 8 hp.....			772	291,331			1,608	761,117
Automobile engines.....	4,608	551,189			33,975	3,773,086		
For motor trucks and buses.....			17	4,792			2,696	308,394
For passenger cars.....			2,458	271,177			27,068	3,257,624
Engines for tractors.....			116	21,328			994	218,538
Engines for aircraft.....	3	6,190	4	2,025	93	54,519	24	23,052
Engine accessories and parts for*.....	411,285	194,653	579,563	265,502	3,857,187	1,537,006	4,350,914	1,920,219
IMPORTS								
Automobiles and chassis.....	37	72,438	74	79,111	210	407,212	388	536,670
Other vehicles and parts for them.....		47,680		200,087		450,298		1,220,520

* Pounds.

PERSONAL NOTES

Garrigus Haynes Advertising Head

Ross H. Garrigus has been appointed advertising manager of the Haynes Automobile Co., having been advanced from the position of assistant advertising manager. In the latter capacity he was in charge of Haynes publicity and the editing of "Successful Selling," the company's magazine.

Elwell Joins Wayne Tank

R. G. Elwell has resigned as advertising manager of the Auburn Automobile Co. of Auburn, Ind., to become advertising manager of the Wayne Tank & Pump Co. of Fort Wayne. Elwell has been with Auburn since 1921, previous to which he served as sales and advertising manager of the Allen Motor Co. of Columbus, Ohio, for seven years.

Mason Tire Appoints Farrington

Henry Farrington, formerly with the Better Tires Co. of Chicago, has been named advertising manager of the Mason Tire & Rubber Co. at Kent, Ohio. Farrington formerly was technical editor of *Popular Mechanics Magazine* and editor of *Power Wagon*.

Troeschler Goes to Factory

William Troeschler, formerly manager of the Premier Motor Sales Co. of Cincinnati, has become assistant sales manager of the Premier company, with headquarters at the factory in Indianapolis.

Preston with Advertising Agency

Paul R. Preston, for twelve years advertising manager for the Rock Island Plow Co., has resigned to establish a tri-city agency in Rock Island for the Ferry-Hanley Advertising Co. Preston is widely known in the Middle West farm implement field. His successor at the plow company has not been named.

Wilson-Lawrenson Resigns

F. A. Wilson-Lawrenson has resigned from the Union Carbide & Carbon Corp. and its various subsidiaries, with which he has been connected since 1917. He served as vice-president in charge of sales of the Prest-O-Lite Co., Inc., National Carbon Co. and American Eveready Works, as well as in other capacities. Too close application to business has somewhat impaired his health, hence the resignation. Lawrenson will go abroad to make an intensive study of economic and business conditions in Europe and Asia for several months.

Fordyce Jones on His Way Here

Fordyce Jones, chairman of the Reliance Rubber Co. of London, is en route to the United States and is expected to be in Akron the forepart of September. He will make a study of the rubber industry while in this country.

MIDWEST FAVORS OWN RUBBER ASSOCIATION

CHICAGO, Aug. 25—Questionnaires were sent recently to all members of the Midwest Rubber Manufacturers Association asking them to express their opinion on three proposals: (1) merger with the Rubber Association of America; (2) merger with the American Rubber Manufacturers' Association, organized recently by Harvey S. Firestone and others; (3) continuation and upbuilding of the Midwest Association.

A majority of those replying favored continuation of the Midwest association, according to Secretary Sutherland. The results of this questionnaire probably will be submitted to a meeting of the membership, to be held in Chicago about Sept. 12. The president of the Midwest Association is Thomas Follen of the Lion Tire & Rubber Corp. of Lafayette, Ind.

Goodyear Tire Passes Its 25th Anniversary

AKRON, Aug. 29—The Goodyear Tire & Rubber Co. today celebrated its twenty-fifth anniversary. Officials of the company quietly celebrated the birthday. Employees will hold their celebration on Labor Day.

Since it was founded a quarter of a century ago by F. A. Seiberling, Goodyear has grown to be one of the largest companies in the world, has established its own rubber plantation in Sumatra, its own cotton plantation in Arizona and operates tire factories in California and Canada.

In addition to several million solid truck tires, thousands of miles of belting, tubing and hose and many hundred millions of rubber heels, the company has made more than 55,000,000 pneumatic tires.

The employees' anniversary celebration on Labor Day will be featured by a balloon race between a Goodyear free balloon and an army balloon.

Michelin Will Market New Cord Balloon Tire

(Continued from page 444)

60 m.p.h. on the road with a rear tire completely deflated without being able to tear it off the rim.

This safety device consists of a flexible steel band mounted inside the casing after the tube has been fitted and consequently resting on the inner face of the bead. After the tire has been mounted, it is inflated to 170 pounds pressure, this pressure expanding the band and causing it to lock automatically with the casing and with the rim. The tire is then deflated to a normal pressure, but the steel band remains expanded.

Business in Oregon Doubled in 7 Months

Average of 103 New Cars Sold Daily Throughout State During That Period

PORTLAND, ORE., Aug. 25—Automobile sales in Oregon have shown a tremendous gain thus far in 1923 as compared with the corresponding period of 1922, according to figures tabulated by the Wilkins' Automobile Information Service for Portland.

For the first seven months of 1923, or until the first of August, nearly two and one-half times as many cars were sold in Oregon as during the first seven months of 1922, according to the report, which showed an average daily sale of cars for the period this year for Multnomah County (Portland) of forty-two and for the rest of the State of sixty-one, making an average daily sale for the entire State of 103 new cars.

This compares with an average of forty-seven new car sales per day for the same period in 1922 for the entire State, a gain of 202 per cent this year over last. This average daily sale of 103 cars since the first of January this year is thought to compare favorably with sales in any other part of the country, in proportion to population.

Peak Month Was July

The peak month of 1923 thus far has been July, according to the report, with 5456 sales of new cars, as compared with 3243 cars sold during July, 1922. Owing to the hold-back in June on account of the half-year license fee going into effect on July 1, June and July should be compared together. Totalling the two months of each year gives 7352 new cars sold in June and July this year, as compared with 4336 in June and July, 1922.

The average number of new cars sold in Multnomah County thus far in 1923 has been 1235 cars monthly, and 1890 cars for the rest of the State, or a total of 3125 monthly. The total sales of new cars in Multnomah County during the seven-month period has been 8679 cars, and for the rest of the State, 13,294. In view of the sales thus far an estimate of over 30,000 new cars sold for the entire year 1923 has been made. Should this be reached, it would easily constitute a record figure for the State of Oregon.

A tabulation of the sales of new cars by months thus far this year, and a comparison of the sales this year to the corresponding months of 1922, is given as follows:

Month	Sales in 1922	Sales in 1923
January	449	1,974
February	658	1,440
March	1,264	3,692
April	1,409	3,819
May	1,742	3,596
June	1,093	1,896
July	3,243	5,456
Total	9,871	21,873

Akron May Get Plant for Rubber Recovery

Understood That Seiberling May
Use Tract, Recently Pur-
chased, as a Site

AKRON, Aug. 29.—The purchase by F. A. Seiberling, president of the Seiberling Rubber Co., of the Barber Cement Products Co. and a tract of eighty acres of industrial land in Barberton, is reported, although the report lacks official confirmation due to the absence of Seiberling in California. Officials of the Seiberling company decline comment upon the reported purchase, although Barberton real estate men who negotiated the deal have announced its details.

It is understood that Seiberling is considering the establishment in the Barber cement plant of a rubber reclaiming plant to serve his own rubber factory and other rubber factories in the Akron district. The property acquired belonged to the estate of the late Ohio C. Barber, founder of the Diamond Match Co.

Rubber company officials admit that there is an acute need in Akron for a rubber reclaiming plant. Goodyear and Firestone now operate their own reclaiming plants, but when they are running at capacity their reclaiming facilities are not large enough to permit any outside work and hundreds of tons of fabric trimmings are shipped daily to Eastern reclaiming plants to have the rubber reclaimed from them.

Much Rubber Reclaimed

It is estimated that for every pneumatic tire made there is an average of nearly three-fifths of a pound of fabric trimming impregnated or frictioned with rubber. Several companies doing the work reclaim more than 50 per cent of the weight of this fabric in rubber, which is returnable to the tire factories and used again.

On a basis, therefore, of an Akron production of 100,000 tires a day, which obtained here for some time this year, there would be an average of nearly 60,000 pounds of fabric to go to the reclaimers, and about 30,000 pounds of reclaimed rubber to be returned to the tire factories. A local reclaiming plant would greatly reduce shipping costs for Akron manufacturers.

Aviators Plan Non-Stop Flight Between Borders

SAN DIEGO, CAL., Aug. 24.—A non-stop flight between the Mexican and Canadian borders, along the Pacific Coast, will be attempted starting Oct. 15 from the international border, about twelve miles from San Diego. The men who will make the flight are Capt. Lowell H. Smith and Lieut. John P. Richter, flying a DeHaviland plane and making their first stop, if successful, at Victoria, B. C.

These men are members of the officer personnel of North Island, the aviation station at San Diego, and are the aviators who first demonstrated that refueling could be accomplished in mid-air. On their flight this fall, they will take on fuel while flying over Sacramento, Cal., and again while over Eugene, Ore. At Sacramento the fueling plane will be handled by Lieut. Virgil Hines and Lieut. Frank Seifert, who refueled Smith and Richter when the latter made their endurance flight here in June, this year.

The object of the Mexico-Canada flight is to demonstrate that the Government can send a squadron of DeHaviland planes the full width of the country in ten hours, without making a stop. The Canadian authorities are preparing a celebration in honor of the arrival of the two American aviators, who expect to leave the Mexican border at daybreak and arrive in Victoria by mid-afternoon of the same day.

Tewksbury Now in Charge of Foreign Trade Manual

WASHINGTON, Aug. 29.—Howard H. Tewksbury, assistant trade commissioner in Havana, Cuba, in 1921 and 1922, has gone with the automotive division of the United States Department of Commerce, in charge of publicity and publications of the division, under M. H. Hoeppli, acting chief. He will have charge of preparing the Automotive Foreign Trade Manual which is being prepared at the behest of the automobile industry and as an adjunct to the securing of more foreign trade.

Tewksbury was selected for the position by virtue of the fact that he is not only familiar with the trade commissioners' work abroad but has been identified with the industry through his affiliation with the General Motors Export Co., from 1919 to the early part of 1921. He is a graduate of Harvard, 1918, with an A. B. degree.

Refuses Bus Application, Competition "Undesirable"

PORTLAND, ME., Aug. 27.—The Maine State Public Utilities Commission has rendered a decision adverse to the motor bus in the controversy waging over the application for certificates authorizing the operation of automobiles, stages and buses over regular routes between Portland and Old Orchard in competition with a steam railroad and a street railway between those points.

In rejecting the application the commission says:

Competition, which adds life and force and incentive to ordinary industries, cannot truthfully be said to be desirable in the conduct of public utilities, which, in their nature, although owned by private individuals, are dedicated to the use of all the citizens of the community. Public utilities must, of necessity, be limited in number in any given community in order to be at all remunerative, and hence able to attract capital for maintenance and development.

Dealers and Makers Stocked with Tires

Higher Production Schedules
Wait on Liquidation of Pres-
ent Big Inventories

AKRON, Aug. 28.—Manufacturers in the Akron district still are feeling the effect of the recent sluggish movement of tires through trade channels and are seeking to liquidate abnormally heavy finished goods inventories before entering upon fall production schedules.

Few companies are laying off men, and none are adding to their forces. Tire sales have shown some improvement, and stocks are moving in better shape from factory warehouses. But until inventories are down to a right balance it is not expected that Akron manufacturers will increase factory forces and launch higher production schedules.

Many companies are resorting to drastic efforts to move tire stocks.

"Cash-to-Dealer" Plan

The Mason Tire & Rubber Co. has adopted a strictly cash-to-dealer plan of distribution and reports that the new system is bringing in new accounts at the rate of more than 1000 a month and cash collections averaging \$50,000 a day. Mason dealers are being urged to carry not more than two weeks' tire stocks.

The General Tire & Rubber Co. is carrying on a strong campaign to urge manufacturers to discontinue announcing tire price reductions. Five thousand or more dealers have replied to a circular letter sent out by the company urging dealers to join the movement to influence manufacturers in abolishing the practice of advertising price reductions.

Perhaps never before in the history of the tire business are dealers being so swamped with circulars from manufacturers as today. The General company sent its circular letter to 77,000 dealers and followed it up with other letters. Mason is also circularizing thousands of dealers with the cash-to-dealer plan. Firestone recently had printed and mailed to dealers 388,000 copies of fifty different letters.

Output 60,000 Daily

Actual tire production in Akron today is far below the peak of 110,000 tires daily, established a few weeks ago. Production is not believed to be more than 60,000 a day if it is that high.

Dealers as well as manufacturers are overstocked. The recent price reductions, instead of stimulating tire sales, greatly retarded them, the motoring public holding off on anticipated purchases in expectation of subsequent price cuts.

There are repeated rumors of other price-cutting movements in contemplation, but it is stated with reasonable authoritativeness that there will not be another tire price reduction for some time to come. Manufacturers admit tire prices now are too low.

Racine, Wis., Seeks to Retain Mitchell

**For Good of City, It Does Not
Want Assets Sold Other
Than in Bulk**

RACINE, WIS., Aug. 27—Recognizing the importance of rehabilitating the industry to the future welfare of Racine, second city in Wisconsin, the Racine Association of Commerce has entered an active campaign to interest prospective purchasers of the property of the defunct Mitchell Motors Co., for which informal bids are being received by Herbert F. Johnson, trustee, pending the formal auction to be held at the plant on Sept. 12.

Information regarding the availability of the necessary skilled craftsmen to man the plant has been gathered and submitted to a large number of concerns in addition to several which are understood to be making overtures to the trustee for the purchase of the property intact. The Racine Manufacturers' Association and the local federation of labor are cooperating in the effort and assisted materially in furnishing complete statistics concerning the labor supply.

The Mitchell plant has always been one of the largest industries of Racine, since the days of the establishment of the Mitchell-Lewis Wagon Co. in 1837. The present factory, covering 35 acres, with nine modern main buildings containing 604,800 sq. ft., is regarded as one of the best equipped in the country for the manufacture of motor cars.

According to F. H. Bartlett, executive director of the Racine Association of Commerce, there is much confidence that its invitation and attractive inducements will result in the transfer of the property in bulk, insuring a market for between 1500 and 2000 workmen comprising the normal force, most of whom have families and own their own homes.

Rover Co. Is Adopting Weymann Body System

LONDON, Aug. 20 (By Mail)—The Rover Co., Coventry has adopted the Weymann system of body construction for its sedan models.

The Rover designs have not the straight lines and square corners of the French originals, and modifications of the principle involved have been found necessary to adapt it to the sweeping curves of the British body outlines.

The framing with cloth panels is mounted on the chassis frame quite separately from the seats, which are directly bolted to the channel members and form detachable units, thus relieving the superstructure of stresses imposed by the passenger load.

The Weymann system of framing joints has been followed, with the clearances between the ends of adjacent mem-

bers between which relative movement might occur, the units being held in their approximate relative positions by metal angle pieces.

Reduced weight and freedom from rattles and creaks are the main practical advantages claimed for this system, together with benefits in production, though reduced costs are not put forward yet by the British licensees. The latter specialize on two chassis models, a 12 hp. four-cylinder and an 8 hp. two-cylinder, air-cooled type, the several plants having a combined output of 200 to 300 cars per week. Of this approximately two-thirds is of the smaller model.

No Harmful Automobile Laws Passed in Georgia

ATLANTA, GA., Aug. 27—The Georgia State Legislature, which has been in annual session in Atlanta the past two months, adjourned in mid-August without passing a single bill of any real importance that would have any serious effect on the automobile industry in the State.

About twenty bills affecting the industry were introduced, of which half a dozen, if passed, would have shouldered the automotive industry in the State with an excessive burden of taxation. Due, however, to the efforts of the legislative committee of the Atlanta Automobile Association, no bill of importance affecting the industry was passed.

Caravan of Fifty Cars Will Cross Continent

NEW YORK, Aug. 28—A caravan of fifty cars, advertising the glories of California, will start from New York City on Sept. 10, headed for the Pacific Coast.

The promoters of the caravan are Syl MacDowell and Warren K. Fryer, who are backed by the Chamber of Commerce of Santa Monica. They have just completed the pathfinding trip in a Chandler from the Pacific Coast East, gathering recruits for the westward journey.

On the Western trip the Chandler will be the pacemaking car, and the itinerary calls for stops at Columbus, Ohio, Indianapolis, St. Louis, Kansas City, Denver, Colorado Springs, Santa Fe, Albuquerque and thence to Santa Monica.

M. B. Automotive Corp. Starts Work on Plant

NASHVILLE, TENN., Aug. 28—Work has started at the Old Hickory plant here remodeling the ten factory buildings obtained by the M. B. Automotive Corp., recently formed under Delaware laws with \$10,000,000 capital. Production at the factory is expected to begin at a comparatively early date.

The total plant will provide 100,000 sq. ft. of floor space, and at the outset will be devoted principally to the manufacture of motor buses, trucks and kindred products.

State Officials Ask Wide Gasoline Probe

**Attorneys General Want to Know
If Standard Oil Is Manipu-
lating Market**

NEW YORK, Aug. 28—Apparently the gasoline situation has passed the price-cutting stage, for developments this week have been more in the nature of threatened investigations and talk of overproduction by the big refiners.

The demand for a probe comes from Minneapolis, where the National Association of Attorney Generals has been meeting representatives of Kansas and Oklahoma asking for a nation-wide investigation to determine "if the Standard Oil Co. is manipulating the gasoline market to put 40,000 mid-country producers out of business."

A. C. Bedford, chairman of the board of the Standard Oil Co. of New Jersey, is the one to sound the note of warning as to overproduction, declaring in a speech at Titusville, Pa., that the oil industry is in a crisis at the present time because of the surplus amount of gasoline.

Bedford declared that gasoline stocks had showed a gain of 50.32 per cent between Jan. 1 and May 31 and that production for the same period was 33.55 per cent over the same months of 1922. Gasoline consumption in 1922, he said, averaged 12,5952 barrels per motor vehicle. With 14,500,000 cars registered at the end of the year, he predicted this year's consumption will be 182,630,950 barrels.

Discussing the crisis Bedford declared:

Whatever the outcome, and it cannot be more than approximately foretold, the extent of the problem of enormous storage for either crude or for gasoline must rest upon the results of such expedients as already resorted to, such as the reduction in price of certain grades of crude, the pro-rating of runs and other steps designed to curtail production.

If the task of financing and carrying over a huge surplus of either crude or gasoline is forced on the industry, it will undertake and accomplish this as it has before undertaken and accomplished tasks beyond its apparent capacity. It is an economic problem which as vitally affects the gasoline consumer of the future as the gasoline user of today, and in a highly competitive business such as the oil industry its ultimate solution will rest with the law of supply and demand.

California Investigation

SAN FRANCISCO, Aug. 24—Federal investigation of the overproduction of crude oil in the California fields, and the relation of that overproduction to the present high price of gasoline in northern California, as compared with prices in southern California, has been undertaken by Henry A. Guiler, special assistant to the United States Attorney General here and head of the Government's anti-trust bureau for California. Guiler and a force of Department of

(Continued on page 458)

FINANCIAL NOTES

Fisher Body Corporation and subsidiaries report a surplus of \$4,777,682, after charges and taxes, for the quarter ended July 31, which is equivalent to \$7.96 a share on the outstanding 600,000 shares of no par common stock. This surplus is made up of \$5,806,110 net earnings, from which is deducted \$361,354 interest and \$667,074 taxes. Exclusive of the Ohio company, the corporation and its subsidiaries had a surplus of \$3,696,394 for the quarter, after charges and Federal taxes, equivalent to \$6.16 a share. This compares with a surplus of \$4,020,770, equivalent, after allowing for preferred dividends, to \$7.93 a share on the 500,000 shares of no par common outstanding in the previous quarter, and \$1,733,433, or \$3.85 a share, in the corresponding period of 1922.

Stromberg Carburetor Co. of America reports net profits for the first half of the year of \$620,969 after expenses and Federal taxes, equivalent to \$8.28 a share on 75,000 shares of no par stock as compared with \$22,594, or \$2.96 a share in the first half of 1922. Earnings totaled \$996,443, with expenses booked at \$261,844, deductions, \$20,630 and Federal taxes, \$93,000. Surplus is \$358,469 and profit and loss surplus \$3,228,400, while assets are scheduled at \$4,448,687.

Yellow Cab Manufacturing Co. has called a stockholders' meeting for Sept. 22 to increase the Class B stock from 200,000 to 400,000 shares of \$10 par value. It is proposed to sell the additional stock to stockholders at \$12.50 a share in the ratio of two new shares for each share held. The proceeds are to be used largely to finance an acceptance corporation as a subsidiary.

Sparks-Withington Co. reports earnings for the six months ended June 30 at the annual rate of \$90 per share on the preferred stock, and after the preferred dividend, of \$13 per share on the common. The balance sheet shows total assets of \$2,055,009 and surplus of \$1,190,815. Total current assets are \$702,441 and current liabilities \$154,945.

C. G. Spring Co. has declared a dividend of \$20 a share on preferred, which clears up all back dividends on the issue. It is understood the company soon will issue new notes and additional capital stock to secure more working capital.

Motor Wheel Corp. reports net earnings for the first half of the year of approximately \$825,000, or nearly equal to earnings for the entire year of 1922.

Pierce-Arrow Motor Car Co. has declared its regular quarterly dividend of \$2 a share on the prior preference stock, payable Oct. 1 to stock of record Sept. 15.

Hall Lamp Co. has declared a dividend of 5 per cent, payable Sept. 25 to holders of record Sept. 22. This makes 20 per cent for the year.

Greenfield Tap & Die Co. has declared the regular quarterly dividend of \$2 on preferred, payable Oct. 1 to stock of record Sept. 14.

Spicer Manufacturing Co. has declared the regular quarterly dividend of \$2 on preferred, payable Oct. 1 to stock of record Sept. 21.

Federal Motor Truck Co. has declared the regular quarterly dividend of 3 per cent, payable Oct. 1 to stock of record Sept. 22.

MASON PAYING IN SCRIP

KENT, OHIO, Aug. 29—A plan to make customers out of its stockholders has been adopted by the **Mason Tire & Rubber Co.**, which is paying all its divi-

dends in scrip. Stockholders can go to Mason dealers and buy tires with this scrip and in turn the dealers can pay the Mason company for their tires with this same scrip.

Shanghai Company Plans Fleet of 30 Motor Buses

WASHINGTON, Aug. 27—Negotiations are under way by the **China General Omnibus Co., Ltd.**, of Shanghai for the inauguration of a motor bus service in that city.

The company proposes to purchase a fleet of 30 motor buses to be used on the line to begin with and is now perfecting its finances for the automotive equipment purchases to be made at some time in the near future. Half page advertisements in the Shanghai papers are being employed to advertise the new project.

The United States Trade Commissioner, **A. Viola Smith**, at Shanghai, has advised the automotive division of the United States Department of Commerce that there is an excellent possibility of some American firm or firms securing orders for the buses. Details of the requirements can be secured from the company's Shanghai address—6 Kiukiang Road, or from the company's attorneys, **White-Cooper, Master & Harris**, 1 Museum Road, Shanghai.

Stay in Air Longest Time and Break Speed Records

SAN DIEGO, CAL., Aug. 28—Capt. **Lowell Smith** and **Lieut. John Richter**, Army aviators, had broken six aviation records when they came to earth here today. They had been in the air for 37 hr. 12 min. 32 sec., beating the previous best of **Kelly and Macready** of 36 hr. 5 min. 21 sec.; they had covered more than 5000 kilometers, or approximately 3200 miles, and also had established four speed records as follows: 2500 kilometers, 17:32:44 4/5; 3000 kilometers, 21:11:00; 3500 kilometers, 24:37:08; 4000 kilometers, 28:06:48.

Accessory Survey Shows Poor British Prospect

WASHINGTON, Aug. 27—There is little chance in the British market for American-made accessories, according to a survey of the accessory situation made by Trade Commissioner **William M. Park**, just received by the automotive division of the United States Department of Commerce.

This is especially true of tire pumps and spark plugs, the survey points out. With pumps, the difficulty of securing any appreciable amount of business is twofold, viz.: competition being so firmly entrenched and extremely low prices of the British pump. With spark plugs it is a question of price, and the fact that American-made plugs, like other accessories, must compete under a handicap of a 33 1/3 per cent. import duty.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

Last week's developments, though somewhat irregular gave further evidence of reviving confidence. The most noticeable upward tendency was in commodity prices, while stock quotations were unsteady with a slight downward trend.

Conditions in the iron and steel industry remain favorable. The feature of the market last week was the heavy buying of rails for 1924; 350,000 tons have already been contracted for, and still heavier orders are expected. The output of pig iron in the first six months of the year was 21,016,475 tons, a new high record for a half-year period.

The production of crude petroleum during the week ended Aug. 18 average 2,250,450 barrels a day, as compared with 2,251,250 barrels the week before and 1,492,450 barrels a year ago.

Car Loadings Show Drop

Car loadings totaled 973,162 for the week ended Aug. 11, showing a decline from the week before of 59,968. This decrease, according to the report of the American Railway Association, was largely due to the observance of the funeral of President Harding. The aggregate net income for July of eighteen railroads in all parts of the country was \$36,148,955, a slight decline from June, but an increase of 29 per cent over the same month last year.

Professor **Irving Fisher's** index of commodity prices for the week ended Aug. 25 was 155, the highest figure recorded since the end of June. **Bradstreet's** food index also showed a slight gain to \$3.18 from \$3.17 last week. The figure a year ago was \$3.09.

Bank debits reported by the Federal Reserve Board for the week ended Aug. 22 totaled \$8,182,305,000, a gain of 10 per cent from the preceding week, in which Aug. 10 was observed as a holiday in most of the districts. Last week's figure was 6 per cent over a year ago.

Discounts by the Federal Reserve banks declined \$20,800,000 during the week ended Aug. 22, the decline being almost entirely in loans secured by Government obligations. A decrease of \$26,100,000 in member banks' reserve balances was partially offset by a slight gain in Government deposits, leaving a net decline of \$20,500,000 in total deposits.

Loans Gain \$6,000,000

Loans of reporting member banks during the preceding week showed a nominal gain of \$6,000,000, while investments declined \$12,000,000. Accommodation at the Federal Reserve banks decreased \$29,000,000, and reserve balances \$23,000,000. Cash in vaults declined \$16,000,000, while net demand deposits rose \$43,000,000.

Money was in light demand last week, with call loans at 4 1/2 to 5 1/2 and time loans at 5 1/4 per cent.

Railways Find Buses Proving Useful Ally

Speaker at Conference Says Both Should Have Same Regu- latory Authority

OSHKOSH, WIS., Aug. 27—The motor bus is proving to be a useful ally to the electric railways of the United States, according to J. W. Welsh, secretary of the American Electric Railway Association, who was a speaker before the annual summer conference of Wisconsin electric railway operators at Oshkosh.

"The motor bus," said Welsh, "has been taken up by many companies to develop extensions into districts not previously served and in some cases to replace non-profitable routes where extensive track, paving and overhead replacements became necessary." Continuing, he said:

The time has come when communities should recognize the necessity of co-ordinating their transportation service as a whole, from the standpoint of public convenience, safety, comfort and economy. It is disastrous to the public to encourage or to permit competition of unregulated buses with the closely circumscribed service and fares of electric railways.

To be fair, both must come under the same regulatory authority and be subject to the same requirements. The alternative is to remove all restrictions from both and let the electric railway give the kind of service it pleases, at any fare it thinks proper to charge, just as is now done with motor bus transportation in many States.

Despite the increasing use of private motor cars and buses, the electric railways of the United States are carrying more passengers than ever before. Comparing the first half of 1923 with 1922, there was an increase of 6.6 per cent in number of passengers carried. The gross revenue, however, increased only 3.5 per cent. At the same time wages increased 2.5 per cent and average fare per passenger decreased 3.6 per cent.

Sees Return to Trolley Car

Henry Cordell, master mechanic of the Chicago, North Shore & Milwaukee, expressed the opinion that motor bus transportation is going to be gradually improved, but that the public taste for "rubber riding" is likely to abate. The bus, he said, is still in stages of development, but looking into the future, he said he could see where bus riders and motorists in general, "fed up" on rubber, gasoline, unavoidable delays due to climatic conditions, etc., will return to the electric car.

Tire Exports Decline

WASHINGTON, Aug. 27—Exports of automobile casings during July showed a big decline over the previous month. July exports were 98,290, compared with 144,556 in June, figures of the United States Bureau of Foreign and Domestic Commerce show.

The export figures show that pneu-

matic tire prices in July remained at about the same level as in the previous two months and about 6 per cent higher than the averages for March and April.

The unit value of solid tires exported was \$24.74 and was at about the same level as in April and May.

"The higher unit value of casings exported is due to the increasing percentage of cord tires shipped and not to any betterment in the price situation in export markets," the statement of the Bureau says.

CRUDE RUBBER UP

NEW YORK, Aug. 28—Crude rubber sold at 30¼ on the New York market today in keeping with the steady climb upward shown within the last few days. It is said that this recent activity and firmness is due mainly to the operations of speculators, tire companies and other large users evincing no interest in the market at the present time.

INDUSTRIAL NOTES

Oldsmar Automotive Accessory Corp., recently formed in Oldsmar, Fla., has acquired the plant of the Oldsmar Manufacturing Co., including a large foundry and machine shops, for the manufacture of automobile parts and accessories, principally Ford accessories. The principal products of the factory will be a fan belt pulley guide, a driving compartment ventilator, and a centrifugal water pump having a capacity of eight gallons per minute, and known as the "3 in 1 for Fords."

National Standard Co. of Niles, Mich., has purchased a five-acre tract of industrial property in North Akron, Ohio, including the two-story brick building of the B. & W. Rubber Co. The acquired Akron factory will be re-equipped at once with machinery for the manufacture of tire beaded wire, according to officials of the company, and will be operated as a subsidiary of the parent company, which now operates a million dollar plant at Niles. The Akron plant will be in operation within 60 days.

Anaconda Copper Co. will start work in September on a \$200,000 addition to its new zinc oxide refining plant in Akron. The first units of the plant were completed several months ago and include seven buildings. The company now is operating twenty-four hours a day and has a capacity of fifteen tons of zinc oxide daily. The original plant in Akron represents an investment of about \$350,000.

L. E. Nutt, manager of the Moline Iron Works, Moline, Ill., announces expansion plans embracing a 24 x 45 foot brick pattern vault and a corer room 40 x 50 feet. The buildings will cost \$17,000 and permit the employment of 600 men on the day shift, eliminating the night shift, which has been necessary since the first of the year.

Edward G. Budd Manufacturing Co., maker of steel automobile bodies, soon will build a large addition to one of its buildings on the north side of Hunting Park Avenue, Philadelphia. The structure will be of reinforced concrete and steel.

Acushnet Process Co., operating a large rubber reclaiming plant at New Bedford, Mass., has opened western offices in Akron with John Lyon in charge. Lyon formerly for several years was with the Federal Rubber Co.

METAL MARKETS

A report current early this week that the leading interest's sheet subsidiary has opened its books for fourth quarter orders met with official denial, and the probabilities are that no such action will be taken before next week's holiday and the vacation period have passed. Meanwhile, the sheet situation continues entirely unaltered with full-finished automobile sheets the strongest. It is frequently pointed out these days that the relative weakness of black sheets, as indicated by frequently recurring reports of price cutting, is, in fact, a sign of strength.

Were it not that the market generally is firm, say those bent upon emphasizing the market's power to resist flabbiness, these constantly reappearing rumors of \$2 per ton cuts in black sheet prices would long ago have led to the lowering of the price all around to that extent. The change from the twelve-hour day continues to furnish a favorite argument to prophets of an advancing market. Sheet mills, however, had very little twelve-hour labor, and so long as sheet bars remain easy at \$42.50, the curtailment of working hours cannot be resorted to as an explanation for advances. In bar mills the change from the twelve-hour day did affect many operatives.

Rumors of an impending advance in steel products prices which are current in Wall Street must be taken with a grain of salt. Steel stocks have not fared any too well lately, and, when some one in the financial district disseminates a "tip" that "the larger steel companies are preparing to announce price advances to offset the higher cost of operation created by the elimination of the twelve-hour day," steel company executives can not be humanly expected to make more than a perfunctory denial of these rumors. It is the easiest thing in the world to advance steel prices, but it is quite another matter to make certain that buyers will pay the advance prices.

No advances will come until there is sufficient demand to warrant them, and so far the demand remains all but dormant. It will be the buyers of steel, and not the sellers, who will bring about the advance. The cold-drawn steel bar situation presents an unpleasant picture from the finishers' point of view, new orders being few and far between and light in tonnage while difficulty is being experienced in inducing those to whom finishers are obligated, on old contracts, to furnish specifications.

Pig Iron.—Little activity is noted, previous price levels being nominally maintained. Bargain and distress lots appear to have been absorbed, and furnace interests are determined to maintain prevailing price levels, this all the more so because of the uncertainty of the coal situation.

Aluminum.—Large tonnages of ingots have been coming in recently from abroad, Norway being the heaviest shipper. Among the entries recently noted at the New York Custom House was one of more than 10,000 ingots from Norway consigned to the sole domestic producer. Small shipments of sheets from the British producers have also been noted. The market situation appears, however, not changed in the least. The major market is well controlled, and in resale transactions the urgency of the seller's need of funds or that of the buyer's need of the metal is the tantamount consideration.

Copper.—Copper and brass products have again undergone downward revision in prices, in keeping with the weak tone of the copper metal market.

Calendar

SHOWS

- Oct. 17-27—New York, Electrical and Industrial Exposition, showing electric trucks, cars, parts and accessories, Grand Central Palace.
- Nov. 4-10—New York, First Automobile Exposition of the Foreign Automotive Association, Hotel Astor.
- Nov. 11-17—New York, Annual Automobile Salon, Hotel Commodore.
- Jan. 26-Feb. 2—Chicago, Annual Automobile Salon, Hotel Drake.

FOREIGN SHOWS

- Sept. 28-Oct. 7—Berlin, Automobile Show.
- Oct. 4-14—Paris, Passenger Cars, Bicycles, Motorcycles and Accessories, Grand Palais.
- Oct. 15-20—London, Motorcycle Show, Olympia.

Oct. 24-Nov. 2—Paris, Trucks, Agricultural Tractors, etc., Grand Palais.

Nov. 1-15—Buenos Aires, Annual Automobile Exposition, under the direction of the Automovil Club Argentino.

Nov. 2-10—London, Automobile Show, Olympia.

Nov. 22-Dec. 1—London, Motor Transport Exhibition.

Dec. 8-19—Brussels, Passenger Cars, Trucks, Airplanes and Motor Boats, Aviation Palace.

RACES

Sept. 3—Annual Pikes Peak Hill Climb.

Sept. 9—Milan, Monza Speedway, European Grand Prix Race.

Oct. 28—Barcelona, Spain, Grand Prix for vehicles of 1500 c.c.; Nov. 1, International Grand Prix for cycle cars of 1100—Nov. 4, Interna-

tional Grand Prix for two liter.

CONVENTIONS

Sept. 19-21—Boston, Fall Meeting of the Motor and Accessory Manufacturers Association.

Oct. 24-26—Cleveland, Thirtieth Annual Convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.

Nov. 12-17—Chicago, Annual Business Exhibit and Convention of the Automotive Equipment Association, Coliseum.

Jan. 24-31—Chicago, Annual Convention and Show of the American Road Builders' Association, the former to be held in the Congress and the latter in the Coliseum.

May, 1924—Detroit, International Motor Transport Congress under the

auspices of the National Automobile Chamber of Commerce.

S. A. E. MEETINGS

Sept. 11—New England Section, Wheel Alignment, John F. Duby, Hotel Buckminster, Boston, 8 p.m.

Sept. 17—Cleveland Section, The Single Eight and Its Merits, J. G. Vincent, Cleveland Hotel, Cleveland, 7:30 p.m., Dinner 6 p.m.

Sept. 20—Metropolitan Section, Headlights, R. N. Falge, Automobile Club of America, 247 West Fifty-fourth Street, New York, 8 p.m., Dinner 6:30 p.m.

Sept. 21—Mid-West Section, Inspection of the Nash plant at Kenosha, Wis.

Oct. 25-26—Production Meeting of the S. A. E.—Cleveland.

Jan. 22-25, 1924—Annual Meeting of the S. A. E.—Detroit.

State Officials Ask Wide Gasoline Probe

(Continued from page 455)

Justice operatives have been at work in the oil fields for some weeks.

Evidence has been adduced showing that storage facilities in the California fields have been taxed to capacity, and that a number of producing wells—whose production would have resulted in a reduction of the price of gasoline—has been shut down by the companies, rather than construct more storage equipment.

It is charged by the Federal agencies that refineries are not running to capacity; that if the refineries were running to capacity, there would be a heavy reduction in the retail price of gasoline; and that there has been sufficient production to keep all the refineries busy all the time, if the companies had allowed them to be operated at capacity.

Gasoline has sold as low as six cents a gallon in Los Angeles, and as low as 11 cents in other southern California cities, but has not dropped below 17 cents in northern California points:

Standard Controls Prices, Says Georgia Law Officials

ATLANTA, GA., Aug. 29—Following a thorough investigation of the gasoline situation in Georgia, George M. Napier, Georgia State attorney, in a letter to Governor Walker states that "gasoline prices in Georgia fluctuate at the nod and beck of the Standard Oil Co., which apparently has spiritual control of the situation locally."

If necessary, the Attorney General stated, legal action will be taken.

HAWKEYE FOUNDER DIES

CEDAR RAPIDS, IOWA, Aug. 28—Martin Beck, aged eighty, founder of the Hawkeye Truck Co. and head of the or-

ganization, died suddenly here. He was a native of Germany, where he learned the wagon-making trade. He came to this country in 1860 and for a number of years engaged in business in Janesville, Wis., with John Laube. In 1891 he came to this city, and with his son, Martin, launched the business which later became the Hawkeye Truck Co. He leaves a son.

Trolley Company Removes Tracks to Install Buses

SPRINGFIELD, ILL., Aug. 29—The Illinois Commerce Commission in permitting the Illinois Traction, Inc., to tear up three and a half miles of its track between Hicks Junction and Ladd, substituting bus service along that route, has shown a new attitude toward electric lines and bus operations.

It is predicted that other Illinois traction lines, feeling the pinch of high maintenance cost along good highways, will seek permission to do the same thing. The company alleged that it was losing \$1,000 annually on this stretch of road. The permission was granted contingent upon the operation of a satisfactory bus line between Spring Valley and Ladd, too.

During the same week, the Rock Island Railroad announced that it would suspend its steam line between Muscatine and Wilton, Iowa, because of motor bus competition, but proposed to maintain the same service by operation of a 60-passenger bus between the two points. The distance is twelve miles but the road says it "can't afford" to keep up train service with its present patronage.

MRS. BERTRAM G. WORK DIES

NEW YORK, Aug. 28—Mrs. Marion Sawyer Work, wife of Bertram G. Work, president of the B. F. Goodrich Co., died Sunday night at the Work's country home at Oyster Bay after an illness of several months.

6 Chassis Embraced in Wolseley's Line

LONDON, Aug. 20 (by mail)—In putting out its program for 1924, the Wolseley Motor Co. has again led the way among British makers, being the first to make a definite announcement concerning next year's models and prices. A range of six entirely distinct chassis models is the basis of the program, with four to six body types for five of these, plus sports models in some cases.

Prices show reductions of varying extent, the most notable being a drop from £525 to £475 in the Fourteen phaeton, which was its most popular model in 1923 with its 3½ x 5½ in. four-cylinder side-valve engine. The output was 100 a week.

On British standards the 1923 price of this model was considered remarkable value, and the £50 reduction will probably cause a flutter in the management offices of many rival concerns. It is doubtless a reply to the recent introduction of the new Armstrong Siddeley Fourteen (3 x 4 in.) at £400, and like the latter, an aim at more direct competition with imported cars.

The Fifteen overhead camshaft model with the same engine dimensions is reduced only from £760 to £745, although it will now have a wider track as standard and be fitted with a five-passenger body instead of one, with width for two passengers only at the rear.

DANIEL BEST DEAD

SAN LEANDRO, CAL., Aug. 25—Daniel Best, founder of the Best Manufacturing Co. of San Leandro, from which developed the Best Tractor Co., died at the age of eighty-five, in his home in San Leandro on Aug. 22. Mr. Best, who had lived here since 1886, is survived by four married daughters and one son, C. L. Best, president of the Best company.